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June 18, 2004
Via Express Mail #ER 520117877 US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: George C. Jeane
Serial No.: 10/068,695
Filed: February 5, 2002
For: "Flipping and Pitching Reel"

LETTER OF TRANSMITTAL

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Enclosed is the Amended Appeal Brief for Appellants, in triplicate, on behalf of Appellant, George Jeane in the above identified application.

Please acknowledge receipt of the above documents by date stamping the enclosed postcard and returning same to the address on the reverse side.

With kindest regards, I am

Very truly yours,

William W. Stagg
Reg. No. 31,225
Attorney for Applicant

WWS/lmk
Enclosures: Appeal Brief, in triplicate
Return Receipt Postcard
cc: Mr. George Jeane
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CERTIFICATE OF MAILING

I, Lucinda M. Kennedy, certify that the foregoing Amended Brief for Appellants, in triplicate, and being deposited with the U.S. Postal Service by Express Mail (#ER 520117877 US) addressed to Mail Stop Appeal Brief – Patent, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 18th day of June, 2004.

Lucinda M. Kennedy

LUCINDA M. KENNEDY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re: Application of George Jeane

Serial No.: 10/068,695
Filing Date: 02/05/02

Examiner: Langdon, Evan H.
Art Unit: 3654

For: Flipping and Pitching Reel

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AMENDED BRIEF FOR APPELLANTS

This is an appeal from the Examiner of Art Unit 3654 refusing Claims 1, 3-19, and 21-36, all of the Claims in the case. Claims 1, 3-19, and 21-36 are the subject of this appeal. The Claims on appeal read as follows:

Related Appeals and Interferences

This Amended Brief is related to a previous Brief filed on April 20, 2004. There are no other related appeals or interferences known to the appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Boards' decision in the pending appeal.

Status of the Claims

Claims 1, 3-19, and 21-26 are currently pending in the application. Claims 2 and 20 were cancelled. Claims 1-4, 21 and 22 were rejected under 35 U.S.C. § 102(b), as they were thought to be anticipated by Shumate et al. Claims 5-7, 11, 13-17, 23 and 24 were rejected under 35 U.S.C. 103(a),as they were thought to be unpatentable over Shumate et al. in view of Zwayer et al. Claims 8-10, 18, 19, 25 and 26 were also rejected under 35 U.S.C. 103(a) as being

unpatentable over Shumate et al. in view of Shakespeare. Claims 1, 3-19, and 21-26 are the subject of this appeal.

Status of Amendments

Applicant has not filed any Amendments subsequent to the Examiner's Final Action rejecting Claims 1, 3-19, and 21-26. Claims 1, 3-19, and 21-36 as previously amended are the subject of this appeal. A copy of all of the Claims, as amended are included in *Appendix A* which is attached hereto.

The References Relied Upon

Shakespeare	1,869,441	Aug. 1932	242/310
Shumate et al.	3,784,124	Jan. 1974	242/297
Zwayer et al.	6,070,822	Jun. 2000	242/310

Summary of the Present Invention

The present invention provides a revolving spool bait casting type reel that can be utilized for casting a fishing lure attached to the end of a fishing line in the conventional overhand manner but is adapted to facilitate the use of the reel when the flipping and pitching casting techniques are employed by the user. The reel of Applicant's invention may include conventional drag and spool-braking systems common on revolving spool bait casting reels, but further incorporates a stationary, centrally situated, line guide on the reel to position the fishing line on a uniquely configured revolving line spool.

Figure 1 illustrates a perspective view of the fishing reel (10) of Applicant's invention mounted on a conventional longitudinally extending casting rod (30). The reel (10) is comprised of a frame (11) having a line guide support (13), line guide (15) and revolving cylindrically shaped spool (20). The spool (20) has a line-holding channel (26) of a substantially rectangular cross-section formed in the center of the spool (20) for holding a length of coiled fishing line (28). The revolving spool (20) is positioned on the reel (10) so that when the reel (10) is mounted on the rod (30), the axis of rotation of the spool (20) is transverse to the longitudinally extending rod (30).

A spooling mechanism (16), having a conventional handle, spool drag, spool release and spool braking mechanisms, is used to control rotation of the spool (20). Fishing line (28) is coiled onto and distributed from the line-holding channel (26) of the spool (20) as the spool (20) revolves during the casting and reeling in of a fishing lure. The reel (10), as shown in Figure 1, is depicted in a side elevation view in Figure 2.

A front elevation view of the fishing reel (10) shown from line 3-3 of Figure 2 is

displayed in Figure 3. The stationary line guide (15) is positioned on the line guide support (13) so as to place the line guide (15) in front of and in line with the middle of the line-holding channel (26) formed in the center of the spool (20). In Figure 3, the line guide (15) is shown as a vertically extending elongated ring, the width of which is less than the width of the line-holding channel (26) and the length of which is less than the depth of the line-holding channel (26). It is thought that line tangling and backlash will be minimized when the vertical dimension of the line guide (15) is kept in the range of about 3/8 to about 5/8 of the depth of the line channel (26) and the width of the line guide (15) is kept in the range of about 3/8 to about 5/8 of the width of the line channel (26). It is also thought that the line will be distributed more readily from the line-holding channel (26) of the revolving spool (20) when the line guide (15) is positioned on the line guide support (13) so as to place its vertical mid-point no lower than approximately the vertical mid-point of the line-holding channel (26) and no higher than approximately the top rim of the line holding channel (26).

Figure 4 is an alternative front elevation view of the fishing reel design shown on line 4-4 of Figure 2. Figure 4 illustrates an alternative embodiment of Applicant's fishing reel design designated as (10a) mounted on a casting rod (30). In the alternative embodiment, the reel (10a) has a circularly configured, stationary line guide (15a) positioned on line guide support (13a) of reel frame (11a) so as to center the line guide (15a) in front of and in line with the middle of the substantially rectangular line-holding channel (26) formed in the center of the spool (20). The circular line guide (15a) has a diameter X, designated as (12a), that is less than the width of the line-holding channel (26). It is thought that the keeping the diameter X of the line guide (15a) in the range of about 3/8 to about 5/8 of the width of the line channel (26) will be suitable for

Applicant's reel and will minimize the incidence of backlash and line tangling while casting with the pitching and flipping methods described herein. Applicant has also found that when the diameter X, designated as (12a), of the line guide (15a) is approximately 3/16 inches and the width of the line channel (26) is approximately 11/32 inches, the incidence of line backlash and tangling during casting of a lure by the pitching and flipping methods described with a reel (10 a) according to Applicant's invention will be further minimized.

Figure 5 shows a cross-sectional view of the fishing reel (10a) cut on line 5-5 of Figure 2. From this view, it can be seen that the spool (20) has a centrally positioned substantially rectangular shaped line-holding channel (26) for retaining a quantity of coiled fishing line. The spool (20) is supported by spool hub (24) that is attached to the transversely extending spool axel (18) that is rotatably mounted on reel frame (11), the rotation of the spool (20) being controlled by the cranking mechanism (16). The line-holding channel (26) of the spool (20) is configured in a substantially rectangular cross-section so as to allow for the fishing line (28) stored around the line-holding channel (26) to be coiled and stacked as the spool (20) is revolved. The substantially rectangular configuration of the channel (26) allows the coiled fishing line (28) to be distributed from the spool (20) uniformly as the spool (20) revolves to discharge the line (28) during a cast.

The circular line guide (15) shown in Figure 5 has a width Y, designated as (14), that is less than the width of the line-holding channel (26). It is thought that the keeping the width Y of the line guide (15) in the range of about 3/8 to about 5/8 of the width of the line channel (26) will be suitable for Applicant's reel and will be sufficient to reduce the incidence of line backlash and

tangling commonly associated with employing pitching and flipping casting methods with revolving spool casting reels.

Figure 6 is a cross-sectional view of the fishing reel (10) cut on line 6-6 of Figure 3. This view illustrates the location of the guide (15) with respect to the spool (20). The guide (15) is positioned forward of and upward from the axel (18) of the spool (20) to guide the line (28) onto the line channel (26). Applicant has found that maintaining the mid-point of the guide (15) at a point no lower than approximately the vertical mid-point of the line-holding channel (26) and no higher than approximately the rim of the line-holding channel (26) will enhance performance of the reel (10) during casting.

Issues

1. Are Claims 1-4, 21 and 22 properly rejected under 35 U.S.C. § 102 as being unpatentable over Shumate et al.

2. Are Claims 5-7, 11, 13-17, 23 and 24 properly rejected under 35 U.S.C. § 103 as being unpatentable over Shumate et al. in view of Zwayer et al.

3. Are Claims 8-10, 18, 19, 25 and 26 properly rejected under 35 U.S.C. § 103 as being unpatentable over Shumate et al. in view of Shakespeare.

Grouping of Claims

Group I

The Examiner rejected claim 1-4, 21 and 22 under 35 U.S.C. § 102 as being unpatentable in view of Shumate et al. Applicant respectfully asserts that the claims of this Group I do not stand or fall together. Explanation as to why the claims of this Group I are believed to be separately patentable is found in the argument.

Group II

Claim 5-7, 11, 13-17, 23 and 24 were rejected under 35 U.S.C. § 103 as being unpatentable in view of Shumate et al in view of Zwayer et al. It is respectfully asserted that the claims of this Group II do not stand or fall together. Explanation as to why the claims of this Group II are believed to be separately patentable is found in the argument.

Group III

Claim 8-10, 18, 19, 25 and 26 were rejected under 35 U.S.C. § 103 as being unpatentable over Shumate et al. in view of Shakespeare. It is respectfully asserted that the claims of this Group II do not stand or fall together. Explanation as to why the claims of this Group III are believed to be separately patentable is found in the argument.

Argument

1. Are Claims 1-4, 21 and 22 properly rejected under 35 U.S.C. § 102 as being unpatentable over Shumate et al.

The Examiner rejected Claims 1-4, 21 and 22 under 35 U.S.C. § 102(b) as they were thought to be anticipated by Shumate et al. Claim 1 has been amended to include the limitations of Claim 2 and Claim 2 has been cancelled. With regard to Claims 1-4 and 21 it was thought by the examiner that Shumate et al. disclosed a fishing reel having a transversely orientated, *revolvable* cylindrical spool mounted to the frame with a recessed channel of substantially rectangular cross-section, being narrowed in depth and centered in the transverse axis; a ring-shaped line guide mounted on the frame in a fixed position forward of the spool; and a means for controlling the rotation of the spool and dispensing fishing line from the channel as the spool rotates during casting of the fishing lure.

MPEP § 2131 states, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. [Citation Omitted] The identical invention must be shown in as completed detail as contained in the ... claim. [Citation Omitted] The elements must be arranged as required by the claim."

Applicant's Claims are directed to a bait-casting reel. Bait-casting reels, as they are known, utilize a revolving-spool to cast a fishing lure.[1] The reel revolves during the cast and the weight of the lure pulls line from the revolving spool while the lure flies toward the intended casting target. (See Applicant's specification at page 3, lines 9 – 10 and page 4, lines 6 – 11.) As set forth in Applicant's specification certain bait-casting techniques increase the tendency of

[1] *Fishing Encyclopedia – Worldwide Angling Guide,* by Ken Schultz, pp. 102 - 114, IDG Books Worldwide, Inc. Copyright 2000 by Ken Schultz, enclosed.

the fishing line to "backlash" and tangle on the reel spool. (See Applicant's specification at page 2, lines 18 – 20.) "Backlash" is customarily defined as the tendency of the line of a bait casting reel to tangle due to spool overrun.[2]

The reel disclosed in Shumate et al. is a cane pole fishing reel and is typical of those reels used for fly fishing. These reels revolve to collect and hold line after or before a cast but do not revolve during the case to dispense the line and lure.[3] Shumate discloses a housing comprised of a generally cylindrical cup configured case. The case includes a cylindrical side wall having a central opening therethrough. An additional opening formed in the cylindrical side wall serves to dispense and rewind the fishing line. The spool disclosed in Shumate comprises a central cylindrical drum having a flat radially outwardly extending flange at each end so to form a space there between and within which the fishing line is wound. There is no separate "recessed channel" on the spool as claimed by applicant. The Shumate patent neither suggests nor discloses that the spool configuration, with its line holding, is beneficial to "backlash" control as the spool revolves during the casting of a lure.

By contrast, a reel having the line spool of applicant's design revolving during the casting of a lure is an expressed feature of the bait casting reel set forth in applicant's specification. For instance, in the specification at page 7, lines 8 – 10 the specification reads:

> The substantially rectangular configuration of the channel (26) allows the coiled fishing line (28) to be distributed from the spool (20) uniformly as the spool (20) revolves to discharge the line (28) during a cast.

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[2] *Backlash – The tangle of line that develops on the spool of a revolving spool reel as a result of the differential between the speed of the line moving through the rod guides and the amount of line being made available to follow the lure by the spin imparted to the reel spool. In essence, the spool moves faster than the line can depart, causing the spool to over run the line and pile up line on the spool. Fishing Encyclopedia – Worldwide Angling Guide,* by Ken Schultz, p. 93, supra.

[3] *Fishing Encyclopedia – Worldwide Angling Guide,* by Ken Schultz, pp. 661 - 665, supra, enclosed.

It is suggested that in making a 35 U.S.C. 102 analysis, the subject matter of each claim as a whole must be taken into consideration and to do so affirmatively involves taking into account all of the limitations of a particular claim. In this case, Claims 1-4 and 21 must be considered to have all of the limitations of their base claim and any intervening claims. When these limitations are considered, the cited reference does not suggest or disclose the claimed combination. It is respectfully suggested that focusing on the shape of the line guide alone or on the shape of the spool alone would be an improper interpretation of the claim. Each claim must be read as a whole and each of the limitations must be considered. For example, while it may be thought that Shumate et al. discloses a revolving spool or a ring-shaped line guide, these features must be viewed in light of all of the limitations of Applicant's Claims 1-4, which are to be considered as a whole. When this is done the additional limitations, such as the "means for controlling the rotation of said spool and thereby dispensing said fishing line from said channel as said spool rotates during the casting of a fishing lure and on to said channel as said spool rotates during retrieval of said fishing lure" would prevent rejection under 35 U.S.C. § 102(b). Further, when the limitations of claim 21 are considered, including the orientation of the channel with respect to the spool, there is nothing in Shumate that discloses or even suggests these limitations. From the foregoing it is respectfully suggested that Claims 1-4 and 21, as amended, are not anticipated, disclosed or suggested by the disclosure of Shumate and Applicant requests that the rejection under 35 U.S.C. § 102(b) be withdrawn.

With respect the Claim 22, it was thought that Shumate et al. shows the vertical midpoint of the line guide is positioned so as to be no lower than approximately the vertical midpoint of the recessed channel and no higher than approximately the top rim of the recessed channel. It is

respectfully suggested that the line guide of Shumate is simply an opening in the cylindrical side wall of the casing. There is no textual reference to designate the forward position of the line guide. The position in Shumate is merely coincidence. Even if the line guide of Shumate is fixed into position within the claimed range, all of the limitations of Applicant's Claims as amended are not included in the cited references. The limitation "means for revolving said spool during the casting of said fishing lure and thereby extending said fishing line during casting of a fishing lure" is not disclosed by Shumate et al. Neither is the limitation placed on the configuration of the line holding channel of Applicant's Claim 22. Consequently, since Shumate does not contain each and every limitation of the Applicant's Claim, it is not proper prior art and does not anticipate the Applicant's invention. As a result, it is respectfully submitted that the rejections based on 35 U.S.C. §102 be withdrawn.

2. Are Claims 5-7, 11, 13-17, 23 and 24 properly rejected under 35 U.S.C. § 103 as being unpatentable over Shumate et al. in view of Zwayer et al.

Claims 5-7, 11, 13-17, 23 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shumate et al. in view of Zwayer et al.. With respect to Claims 5, 13 and 23, it was thought by the Examiner that Shumate et al. failed to show the ring guide member as being substantially circular, while Zwayer taught a ring guide member being circular in shape and that is smooth to reduce friction and snaps into place. The Examiner thought that it was obvious to one skilled in the art at the time the invention was made to modify the ring guide of Shumate to include a circular shape as suggested by Zwayer et al., to reduce friction and minimize backlash.

In response to the rejections of Claims 5, 13 and 23 as being unpatentable under 35 U.S.C. 103 (a) over Shumate et al. in view of Zwayer et al., Applicant respectfully asserts that there would have been no motivation to combine Shumate and Zwayer to make the claimed invention. MPEP §2143.01 states: "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *** If [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. (Citations omitted, emphasis in original)."

Shumate and Zwayer address problems that are different from that solved by the present invention, and that are also very different from one another. A person of ordinary skill in the art would not have combined their teachings. Shumate, the primary reference cited by the Examiner, was thought to disclose a reel having a transversely orientated, cylindrical spool mounted to the frame, a channel for holding a length of fishing line, a means for positioning the fishing line onto the channel and a means for controlling the rotation of the spool. Zwayer, the secondary reference cited by the Examiner, was thought to disclose a ring guide member being circular in shape and is smooth to reduce friction on a spincast reel. In spincast reels, the spool is stationary and a spinner mechanism is employed to wind the line around a fixed spool.[4] It is the fixed spool that makes the reel "tangle free".

Shumate never suggests the use of a ring guide member, circular or otherwise. By contrast, one embodiment of Shumate discloses an "opening" in the side of the cylindrical wall of the case in order to distribute the fishing line on to a revolvable reel spool. The ring opening

[4] U.S. Patent 4,662,585 to Neufeld; REELS, The Ultimate Bass Fishing Resource Guide® Copyright 1997-2004. www.bassresource.com.

in the cover of Zwayer provides access to the fixed spool. Thus, while two patents may have similar purposes (i.e., fishing reels), there would have been no motivation to combine Shumate and Zwayer to produce the fishing reel that has a spool that continuously revolves during casting and retrieved by a lure as claimed by applicant.

As MPEP §2143.01 confirms, an invention is not obvious merely because different components of the invention may be found somewhere in different pieces of prior art. With the benefit of hindsight, essentially all inventions may be viewed as being composed of old parts, arranged in a new way. But an invention is not obvious unless the prior art provides some motivation to make the proposed combination of old parts, with a reasonable expectation of success. Here, there was none. There would have been no motivation for a person of ordinary skill in the art to combine a reference concerning a cane pole fishing reel, which is intended to eliminate the necessity to wind the line around the pole so to shorten or unwind the line, with a reference that relates to hook keepers for spincast fishing reels. Neither reference suggests the guide orientation in a reel that is designed to prevent backlash. To the contrary both Shumate and Zwayer teach devices that specifically do not address the problem of backlash. Because, Shumate and Zwayer are directed to completely different types of reels, they teach away from each other.

Considering the foregoing, it is respectfully suggested that Shumate et al. and Zwayer et al. do not teach each and every limitation of Applicant's Claims 5, 13 and 23, as amended, and furthermore there is no motivation to combine there teachings and thus do not serve as proper references under 35 U.S.C. § 103(a) to support a rejection.

With respect to Claims 6, 11, 14, 16 and 24 it was thought by the Examiner that Shumate et al. as modified by Zwayer et al. did not disclose specific values for the diameter of the line guide and the width of the line channel. However, the examiner thought that one of ordinary skill in the art is expected to routinely experiment with the parameters specifically when the specifics are not disclosed, so as to ascertain the optimum or workable ranges for a particular use and that it would have been no more than a matter of obvious engineering design choice to select the claimed ranges. In response to this rejection Applicant respectfully suggest that one cannot base obviousness upon what a person skilled in the art might try or might find obvious to try but rather one must consider what one might be led to do in light of the prior art. It is respectfully suggested that neither Shumate nor Zwayer considers the line guide dimensions or position as a potential remedy for controlling "backlash" in a spool that revolves during the cast. Nothing in Shumate et al. or Zwayer et al. even suggests that the spool revolves during the casting of a lure or even address the problem of backlash.

Applicant also respectfully suggests that all of the limitations of the claims must be considered and that the claims, as amended, are not suggested by Shumate et al. or Zwayer et al.. It is suggested that it would be incorrect to focus the §103 inquiry on a particular limitation or on the "gist" of the invention relative to prior art. The differences between the claims and the cited references must be considered. See *In re Gulack*, 703 F. 2d 1381, 217 U.S.P.Q. 401 (Fed. Cir. 1983).. When these limitations are considered, the cited references do not suggest or disclose the limitations of Applicant's Claims.

Considering the foregoing it is respectfully asserted that Claims 5-7, 11, 13-17, 23 and 24 as now amended, are not suggested or disclosed by the cited references and Applicant respectfully requests that the rejection of these Claims under 35 U.S.C. 103(a) be withdrawn.

3. Are Claims 8-10, 18, 19, 25 and 26 properly rejected under 35 U.S.C. § 103 as being unpatentable over Shumate et al. in view of Shakespeare.

Claims 8-10, 18, 19, 25 and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shumate et al. in view of Shakespeare. The Examiner noted that in regards to Claims 8, 18, and 25, Shumate et al. failed to show the ring guide member as being a substantially vertically extending elongate ring. However, the Examiner thought that Shakespeare taught a ring guide member shaped as an elongated endless guide eye having an improvement over the prior art wherein the line guide eye provides a rounded wear surface to the line and press fits to the frame. The Examiner was of the opinion that it was obvious to one of ordinary skill in the art at the time the invention was made to modify the ring guide of Shumate to include a substantially vertically extending elongate ring shape as suggested by Shakespeare, in order to reduce friction and minimize backlash.

In response, to the rejection of Claims 8, 18 and 25 as being unpatentable under 35 U.S.C. § 103(a) over Shumate et al. in view of Shakespeare, Applicant again respectfully asserts that there would have been no motivation to combine Shumate and Shakespeare to make the claimed invention. When relying on numerous references or a modification of prior art, it is incumbent upon the examiner to identify some suggestion to combine references or make the modification. *Motorola Inc. v. Interdigital Technology Corp.*, 43 U.S.P.Q. 2d 1481 (CAFC

1997); *In re Jones*, 958 F.2d 347, 351, 21 U.S.P.Q. 2d 1941, 1943 (Fed. Cir. 1992) (stating that there must be some suggestion to combine, "either in the references themselves or in the knowledge generally available to one of ordinary skill in the art"); *see Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 292, 227 U.S.P.Q. 657, 664 (Fed. Cir. 1985). The line guide of Shumate is simply an "opening" in the cylindrical side wall, fixed in a constant position. See Shumate et al. at Col. 1, lines 56-60. In Shakespeare, the secondary reference cited by the Examiner, the elongated endless guide eye as shown in Figure 1 and Figures 3-4 is of a shape corresponding to the opening of the casing and is longitudinally curved. See Shakespeare at Col. 1, lines 47-50. Nothing in Shakespeare suggests that a stationary elongated line guide, in the absence of the level wind system, would serve to reduce or eliminate backlash during casting of a revolving spool reel. As mentioned earlier, an invention is not obvious merely because different components of the invention may be found somewhere in different pieces of prior art. There must be some motivation to make the proposed combination of old parts, with a reasonable expectation of success. Neither Shumate et al. or Shakespeare suggest a fishing reel that contains a substantially rectangular channel which allows coiled fishing line to be distributed from the spool uniformly as the spool revolves to discharge the line during a cast, while also preventing backlash.

There is nothing in Shumate et al. or Shakespeare that would motivate an ordinary person skilled in the art to combine their teachings to create the device claimed by the applicant. The line guide of Shakespeare is designed for a purpose that is substantially different from the purpose of the claimed invention of the applicant. The line guide of Shakespeare was designed to prevent wear on the line as it played back and forth on the spool and to provide an attractive

finish. See Shakespeare Col 1, lines 1 - 5 and 96 -99. It is the position of the line guide as a means to prevent line wear, not the width or length of the guide as a means for controlling backlash, with which Shakespeare is concerned. Consequently, adjustments in the line guide dimensions or the width of the line spool as it relates to the "elongated" guide of Shakespeare would not be an ordinary concern or an indication for experimentation for engineering design choices.

With regard to Claims 9, 19 and 26, the Examiner noted that Shumate et al. as modified by Shakespeare did not disclose specific values for the line guide diameter or channel width. Both parameters are distinct features of these claims. However, it was thought that one of ordinary skill in the art would routinely experiment with these parameters so as to ascertain the optimum or workable ranges for a particular use. With regard to the claimed specific value limitations for the line guide diameter or channel width, Applicant re-argues that all of the limitations of the claims must be considered and that the claims, as amended, are not suggested by Shumate as modified by Shakespeare. The differences between the claims and the cited references must be considered. See *In re Gulack*, supra. When these limitations are considered, the cited references do not suggest or disclose the limitations of Applicant's Claims.

Nothing in the cited prior art suggests a relationship between the dimensions of the line guide and the dimensions of the spool width as a means for controlling "backlash" or line tangling. Consequently, there is no suggestion that experimentation in this area would be indicated or suggested as a basis to pursue a solution to line tangling or "backlash." Applicant respectfully suggests that the test is not "obvious to try" such design choice but "obvious to do" these choices. Since the cited references do not disclose or even suggest the claimed

relationships between the line guide dimensions and spool channel width, which are key structural elements of these claims and that as such cannot be ignored, there is no indication that alteration of the relationships would be obvious to a person ordinarily skilled in the art to which the invention pertains as a means to control backlash and line tangle and therefore there is no basis for rejection of Claims 9, 19 and 26, as may be amended, under 35 U.S.C. § 103(a). *See In re Clinton*, 527 F.2d 1226, 168 U.S.P.Q. 365 (CCPA 1976); *In re Antonie*, 559 F. 2d 618, 195 U.S.P.Q. 6 (C.C.P.A. 1977) and *In re Gulack,* 703 F. 2d 1381, 217 U.S.P.Q. 401 (Fed. Cir. 1983). Therefore the Applicant respectfully submits that the rejection of Claims based on 35 U.S.C. 103 be withdrawn.

Conclusion

It is the Applicant's position that none of the references cited by the Examiner in his Final Action rejecting all of the Applicant's Claims were applicable and dispositive. Shumate et al. proposes an "opening" in the cylindrical side wall of the case that serves to dispense and rewind the fishing line. In Zwayer et al., the line guide is simply a circular opening in the cone piece of the cover assembly, of a spin cast reel in which the spool does not revolve to take or dispense line while Shakespeare suggests the use of either a circular opening or elongated eye guide. The eye guide in Shakespeare only purports to decrease the wear and tear of the spool string in the process of casting and reeling in.

These teachings are directly in opposite to the suggested teachings of the Applicant. The Applicant's invention specifically addresses the problem of backlash, which is not mentioned either expressly or implicitly in the references cited by the Examiner. As a result, it is respectfully suggested that these references are not properly combinable to provide prima facie rejections of Claims 1, 3-19, and 21-26, the Claims on appeal.

For the foregoing reasons the Applicant submits that the rejection of Claims 1, 3-19 and 21-26 is in error and should be reversed.

Respectfully submitted,

By: _____

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Appendix A

1. A fishing reel, comprising:
   a) a frame, said frame having forward and rearward ends and two sides;
   b) a transversely orientated, revolvable cylindrical spool mounted to said frame, said spool having a recessed channel for holding a length of coiled fishing line; and
   c) a line guide mounted on said frame in a fixed position forward of said spool; and
   d) means for controlling the rotation of said spool and thereby dispensing said fishing line from said channel as said spool rotates during the casting of a fishing lure and on to said channel as said spool rotates during retrieval of said fishing lure.

2. (cancelled)

3. The fishing reel according to claim 1 wherein, said recessed channel of said spool has a substantially rectangular cross-section.

4. The fishing reel according to claim 3 wherein, the vertical mid-point of said line guide opening is positioned so as to be no lower than approximately the vertical mid-point of said recessed channel and no higher than approximately the top rim of said recessed channel.

5. The fishing reel according to claim 4 wherein, said line guide is substantially circular.

6. The fishing reel according to claim 5 wherein, the diameter of said substantially circular line guide is in the range of about 3/8 to about 5/8 of the width of said channel.

7. The fishing reel according to claim 6 wherein, the center of said substantially circular line guide is positioned no lower than approximately the vertical mid-point of said channel and no higher than approximately the rim of said channel.

8. The fishing reel according to claim 4 wherein, said line guide is a vertically extending elongated ring.

9. The fishing reel according to claim 8, the width of said elongated ring line guide being in the range of about 3/8 to about 5/8 of the width of the said channel and the length of said elongated ring line guide being in the range of about 3/8 to about 5/8 of the depth of said channel.

10. The fishing reel according to claim 9 wherein, the mid-point of said elongated ring line guide is fixedly positioned no lower than approximately the vertical mid-point of said channel and no higher than approximately the rim of said channel.

11. The fishing reel according to claim 5 wherein, said line guide is approximately 3/16 inches in diameter and said line channel is approximately 11/32 inches in width.

12. The fishing reel according to claim 11 wherein, the center of said line guide is positioned no lower than approximately the vertical mid-point of said channel and no higher than approximately the rim of said channel.

13. A fishing reel, comprising:

a) a frame, said frame having forward and rearward ends and two sides;

b) a transversely orientated, revolvable cylindrical spool mounted to said frame, said spool having a recessed channel of a substantially rectangular cross-section for holding a length of coiled fishing line; and

c) a circular line guide fixedly mounted on said frame forward of said spool for positioning said fishing line onto said channel of said spool, the center of said line guide positioned so as to be in alignment with the vertical mid-point of said recessed channel; and

d) means for controlling the rotation of said spool and thereby dispensing said fishing line from said channel as said spool rotates during the casting of a fishing lure and on to said channel as said spool rotates during retrieval of said fishing lure.

14. The fishing reel according to claim 13 wherein, the diameter of said line guide is in the range of about 3/8 to about 5/8 of the width of said channel.

15. The fishing reel according to claim 14 wherein, the center of said line guide is positioned no lower than approximately the vertical mid-point of said channel and no higher than approximately the rim of said channel.

16. The fishing reel according to claim 13 wherein, said line guide is approximately 3/16 inches in diameter and said line channel is approximately 11/32 inches in width.

17. The fishing reel according to claim 16 wherein, the center of said line guide is positioned no lower than approximately the vertical mid-point of said channel and no higher than approximately the rim of said channel.

18. A fishing reel, comprising:

a) a frame, said frame having forward and rearward ends and two sides;

b) a transversely orientated, revolvable cylindrical spool mounted to said frame, said spool having a recessed channel of a substantially rectangular cross-section for holding a length of coiled fishing line; and

c) a line guide fixedly mounted on said frame forward of said spool for positioning said fishing line onto said channel of said spool, said line guide being configured as a vertically extending elongated ring, the vertical mid-point of said elongated ring positioned so as to be no lower than approximately the vertical mid-point of said recessed channel and no higher than approximately the top rim of said recessed channel; and

d) means for controlling the rotation of said spool and thereby dispensing said fishing line from said channel as said spool rotates during the casing of a fishing lure and on to said channel as said spool rotates during retrieval of said fishing lure.

19. The fishing reel according to claim 18 wherein, the width of said elongated ring line guide being in the range of about 3/8 to about 5/8 of the width of the said channel and the length of said elongated ring line guide being in the range of about 3/8 to about 5/8 of the depth of said channel.

20. (cancelled)

21. A bait casting reel for casing a fishing lure comprising:

a) a frame;

b) a means for mounting said frame on a longitudinally extending fishing rod;

c) a revolving cylindrically shaped spool mounted on said frame, said spool being positioned on said frame whereby the axis of rotation of said spool is transverse to said longitudinally extending fishing rod when said frame is mounted on said fishing rod, said spool having a line-holding channel of a substantially rectangular cross-section said channel cross-section being narrower than its depth, said channel being positioned in the center of said transverse axis of said spool for holding a length of fishing line therein;

d) a ring-shaped line guide mounted on said frame in a fixed position forward of said spool and at a point in line with the center of said transverse axis of said spool for positioning said fishing line onto said channel of said spool;

e) means for releasing said spool and thereby allowing said spool to revolve during the casting of a fishing lure and thereby dispensing fishing line from said line-holding channel; and

f) means for revolving said spool during retrieval of said line and thereby coiling said fishing line onto said line-holding channel.

22. The fishing reel according to claim 21 wherein, the vertical mid-point of said ring-shaped line guide is positioned so as to be no lower than approximately the vertical mid-point of said line-holding channel and no higher than approximately the top rim of said line-holding channel.

23. The fishing reel according to claim 22 wherein, said ring-shaped line guide is substantially circular.

24. The fishing reel according to claim 23 wherein, the diameter of said substantially circular ring-shaped line guide is in the range of about 3/8 to about 5/8 of the width of said channel.

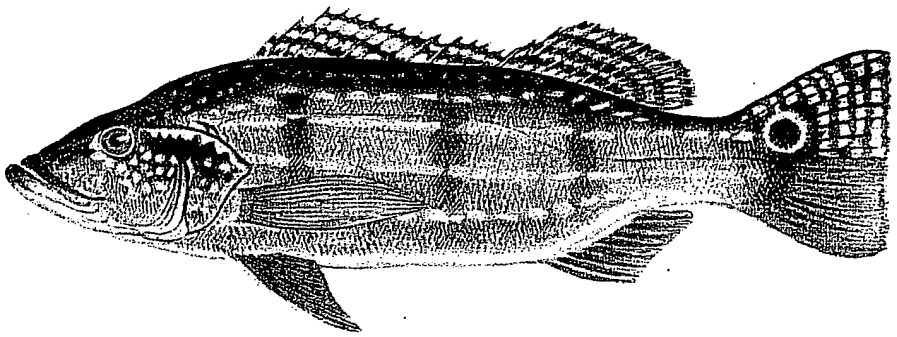
25. The fishing reel according to claim 24 wherein, said line guide ring is a vertically extending elongated ring.

26. The fishing reel according to claim 25, with the width of said elongated line guide ring is in the range of about 3/8 to about 5/8 of the width of the said rectangular channel and the length of said elongated line guide ring is in the range of about 3/8 to about 5/8 of the depth of said channel.

KEN SCHULTZ'S

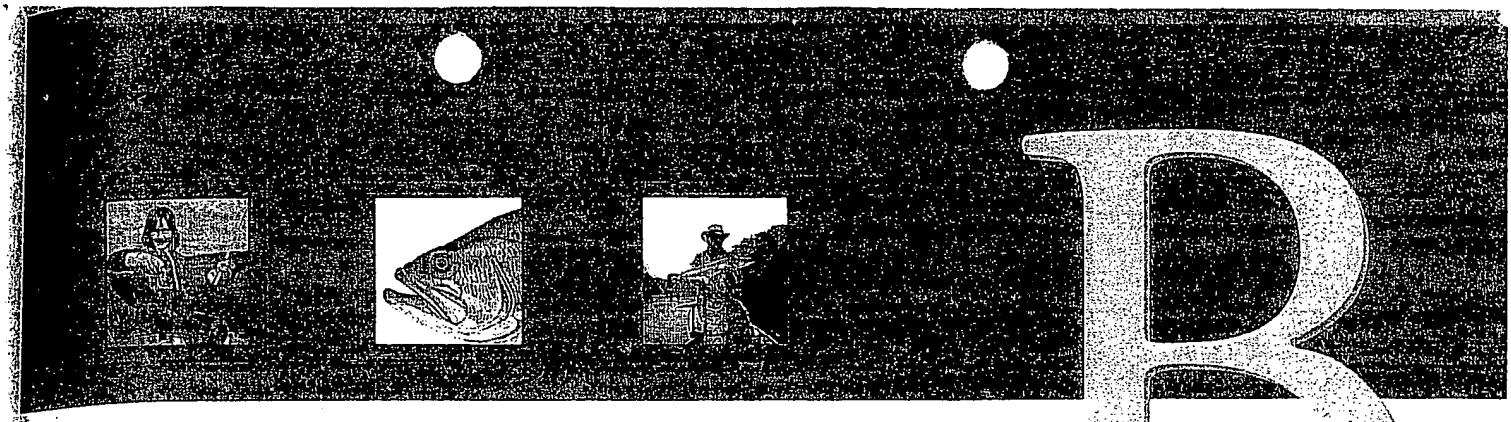
Fishing Encyclopedia

Worldwide Angling Guide



Ken Schultz

IDG BOOKS WORLDWIDE



BACK BOUNCING

See: Backtrolling.

BACK CAST

The backward motion of the rod and line in flycasting.

See: Flycasting Tackle.

BACKING

Reserve line that is connected to the main line on the spool of a reel for situations when greater line lengths are necessary. Backing is normally of a different type or strength than the main line and is most commonly used on flycasting reels, where it is attached to the fly line, since it is practical to cast only a certain amount of fly line. Backing may be employed with other forms of tackle, although in these it is most common to use a continuous length of the same line to fill the spool.

See: Flycasting Tackle.

BACKING DOWN

A boat manipulation tactic primarily used in offshore fishing *(see)* to help an angler gain line when hooked up to a large and strong fish. The boat is driven in reverse, with its stern facing in the direction of the fish and the line. The angler winds line on the reel while the boat backs (often swiftly) toward the fish. The boat captain backs down instead of turning and heading toward the fish so he can see the line and the position of the fish. This prevents the boat from interfering with the fish and also prevents slack from developing in the line.

This fish-fighting strategy may be necessary when a fish has taken an exceptional amount of line and the angler is in danger of losing all the line on the reel. It may also be used where significant boat traffic or obstructions could enable a fish to break the line. Because anglers have more control over a fish on a short length of line than a long one, backing down will narrow the distance to the fish and possibly help prevent its loss. This tactic may be put to use unfairly by anglers employing light tackle in open water (often when fishing during a contest or for the sake of establishing a light-line record). By lessening the effect of a long length of line on light tackle and reel drag, the angler can bring a fish to capture more quickly than would have been possible otherwise.

See: Playing Fish.

BACKLASH

The tangle of line that develops on the spool of a revolving spool reel as a result of the differential between the speed of the line moving through the rod guides and the amount of line being made available to follow the lure by the spin imparted to the reel spool. In essence, the spool moves faster than the line can depart, causing the spool to overrun the line and pile up line on the spool. The causes and preventions for this are discussed in other entries *(see: baitcasting tackle; conventional tackle).*

One way to attempt to remove a backlash in a revolving spool reel is to put the reel in gear, tighten the drag so it doesn't slip, press the thumbnail of your rod-holding hand on the snarl to flatten and relax the coils, take two or three turns of the reel handle, put the reel in gear, and pull out the line. This does not tighten the coils and should allow you to get all but the worst backlashes out in a few seconds. Make sure you reset the drag.

Many people pick at the backlashed loops of line with their fingers. To do this, put the reel in freespool with your thumb on the spool. Carefully pick away at the leading loops to remove tightening overwraps until you get to the loop that is dug in the worst; then pull it out. Get all snarled line segments out before rewinding the line on the spool, and do not wind over any loops.

See: Casting.

BACK-REEL

The activity of turning the handle on a reel backward. This is possible on reels with direct drive, and also on baitcasting, spincasting, and spinning reels that have a selective anti-reverse, in which the user can elect to turn the anti-reverse mechanism off, thus allowing the drive gear to move either forward or backward, as well as the handle of the reel to turn forward or backward.

In the past, when reel drags were poor and often unreliable, anglers felt more comfortable when playing a strong fish if they could reel backward to let line out to play the fish. Many were accustomed to doing this with baitcasting, or levelwind, reels, which initially had direct drive and had to be back-reeled, or wound backward, when a strong fish put a lot of pressure on the reel.

The trouble with back-reeling is that rarely can you reel backward quickly enough to keep up with a rapidly turning handle when a strong fish speeds off; therefore, you have to let go of the handle,

bass) refer to a lure as a "bait" even though it is strictly artificial. Lures *(see)* are reviewed elsewhere.

BAIT-AND-SWITCH

A saltwater angling tactic in which a trolled hookless teaser (usually an offshore lure or daisy chain) that has attracted a fish (usually a billfish) is quickly removed from the water while a hooked lure, bait, or fly is simultaneously presented. The substitute offering is usually one that—either because of its size or because of the light tackle being employed—could not be trolled at high speeds or would not create enough attraction to bring the fish in. The teaser does the work of bringing the fish close to the real lure. Bait-and-switch is used in particular with very light tackle, and for casting a lure or fly to a big-game fish.

See: Big-Game Tackle; Trolling Lures, Saltwater.

BAIT BUCKET

A round container to hold live bait; also, in saltwater, a term for a milk crate or chum pot *(see)* used for holding chum *(see)* in the water alongside the boat. Bait buckets may hold fish, frogs, crickets, eels, crayfish, or other items; large buckets used for containing baitfish may be equipped with portable aerators for oxygenating the water. For baitfish, common buckets are made of steel or plastic and have a perforated insert pail that contains the bait and can be easily removed to facilitate water changing; another common version is a floating plastic bucket with a spring-loaded door, which is kept in the water when the boat is at rest or when it is slowly trolled.

See: Bait Container.

BAITCASTING TACKLE

Baitcasting tackle is a type of light- to medium-light multipurpose fishing equipment characterized by a reel with a revolving spool that turns to dispense and retrieve line. The spool rotates like sewing thread, with the line moving perpendicular to the spool axis.

This equipment is related in general characteristics to conventional tackle *(see)*, which sports a larger revolving spool reel, has a greater ability to deal with strong fish, and holds more line. It is distinctive from spinning tackle *(see)* and spincasting tackle *(see)*, which both feature a stationary spool around which line is wound.

Baitcasting tackle ranks first in sales revenue in North America, where it is widely used, and third in sales volume (behind spincasting and spinning tackle), but it is not commonplace outside North America. Baitcasting reels are sometimes called levelwinds because all such reels have a feature that automatically distributes the line evenly across the spool as it is retrieved.

This tackle is not relegated to use with natural bait *(see)*, as its name implies; it can be used with natural bait and for trolling, but it is most likely to be employed in casting artificial lures. It can be used for light saltwater activity but is principally a freshwater fishing tool. It is especially popular in angling for largemouth bass and is widely used for most of the major species when fishing with heavier lures and terminal rigs.

Baitcasting reels predate spinning and spincasting reels. They were once notorious for being difficult to learn to use without incurring a backlash, or spool overrun, in which a bird's nest of line had to be painstakingly untangled. As a result, anglers flocked to the easier to use stationary spool products when they were introduced in the 1940s and 50s. Modern reels have greatly reduced this backlash problem. Meanwhile, the advantages of baitcasting tackle continue to be accurate lure placement in casting, superior cranking power, and control over strong-fighting fish.

Today, this equipment is vastly different, more angler-friendly, and compatible with diverse fishing methods. Appropriate baitcasting tackle may be used for virtually all fishing methods, including casting, trolling, and fishing with bait.

Reels

As a revolving spool product, the baitcasting reel has the same origins as the conventional revolving spool reel. The development of both has been intertwined since the nineteenth century. Baitcasting reels originated in Kentucky between 1800 and 1810, when a single-action revolving-spool reel (essentially a fly reel) was the only reel available for sportfishing, and anglers used only natural bait or artificial flies. The single-action reel was used to store and retrieve line and had no casting function. To present natural baits at any distance, anglers stripped an appropriate length of line off a single-action reel and either looped the line and laid it aside or coiled it in the noncasting hand. Using a wooden rod, they made a sideways motion to propel the bait and carry the stripped-off line. This was done because the bait and any weights used could not overcome the inertia of the single-action spool.

Between 1800 and 1810, George Snyder, a Kentucky watchmaker, and reputedly president of the Bourbon Angling Club, invented a reel with a delicate spool that would pay out line during the cast and that revolved several times for each turn of the crank handle. Thus was born the multiple-action reel, to be called the multiplier or multiplying reel, as well as a spool capable of dispensing line during a cast. The line of that day was raw silk, and there were no lures; for decades multiplying reels were small and because they were exclusively used for tossing natural baits, they were called baitcasting reels.

For most of the nineteenth century, such reels were made by hand. Various modifications and

improvements were made, including the addition of a mechanism to distribute line evenly on the spool (called levelwind), better gears, and the addition of external drag. What had developed as a tool for freshwater fishing, primarily for bass, became available in large sizes for situations where greater line capacity and mechanical strength was needed.

These reels were soon used for really powerful fish in saltwater. The lack of an internal drag mechanism, however, meant the fish didn't have to work for the line it took off. To offset this, anglers applied pressure to the reel spool with their thumbs (which was ineffective for large fish and sometimes painful to the angler) or with a leather thumb pad attached to the reel frame.

William C. Boschen, a member of the legendary Catalina Tuna Club of California, is credited with originating the concept of the first internal star drag on revolving spool reels, a handy threaded knob adjustment that internally regulated spool pressure. A prototype of a reel with such a device was reportedly made for Boschen by Brooklyn, New York, reel manufacturer Julius Vom Hofe. Boschen used it to catch the first broadbill swordfish (358 pounds) ever taken on sporting rod and reel. That catch was made in the summer of 1913 off Catalina Island Later versions of this reel were named B-Ocean.

This product was the predecessor of modern revolving-spool reels. The star drag mechanism provided an internal friction adjustment mechanism, or brake, that provided greater resistance against strong fish and slowed the rate of line being pulled off the reel. This mechanism was incorporated in all types and sizes of revolving-spool reels in later years. Today all conventional or baitcasting reels feature a star drag. A baitcasting reel is essentially a small revolving-spool reel with a levelwind line-guiding mechanism and star-spoked wheel drag adjustment.

The largest baitcasting reel is about the size of the smallest conventional reel. Most modern baitcasting reels are used primarily for cast-and-retrieve angling (with lures rather than natural bait) and are likely to be fished with heavier lures and weights than spinning or spincasting reels. They're all suitable for casting, but the larger models are not comfortable for continuous casting. Some light models, however, are used with very light lines and lures, some heavier and large-capacity models are used in very demanding situations, and trolling and baitfishing are eminently feasible in addition to casting.

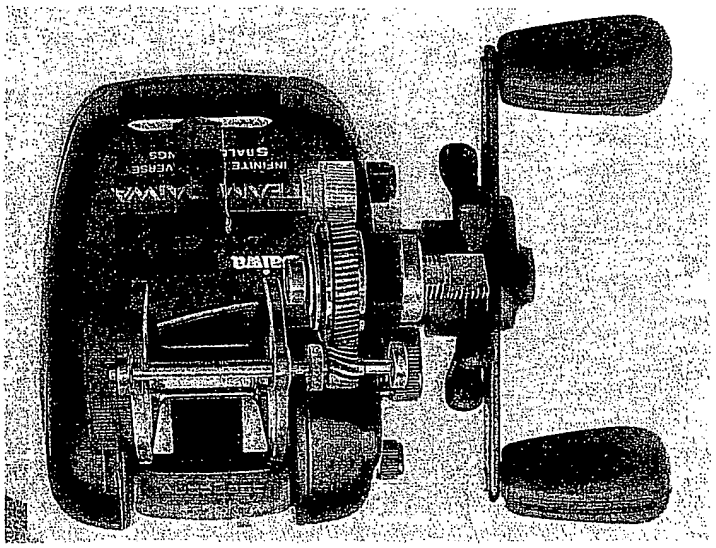
Gears, cast control, and drag are the most critical components of baitcasting reels. The cast control and gears are especially important because they significantly affect casting and retrieving functions. The main problem with a baitcasting reel is that, when casting, it is tough for the user to control the movement of the spool making it difficult to avoid a backlash. When control is mastered, however, the angler can be extremely accurate when casting with this equipment. Gears are of special concern when it comes to line recovery and cranking power. Many baitcasting reel users seldom use the drag feature; others, use it only occasionally, but when they do use it, it is important to them. Drag tension is not easily or readily adjustable to known levels, however, during the fight of an especially strong fish, a weakness that is seldom a problem for anglers who know how to use their tackle well.

General Operation

Baitcasting tackle basically works like all tackle except flycasting: A weighted object at the end of the line pulls line from the spool. The spool of a baitcasting reel revolves as line pays out during the cast and as it is retrieved when the handle is turned. When the gears are disengaged and line is dispensed from the reel, a backlash, or spool overrun, can occur when the revolving spool turns faster than the line is leaving the spool. Applying light pressure to the spool can prevent this.

The baitcasting reel has a spool release clutch in the form of a button or bar that activates or deactivates the gears; this takes the reel into or out of freespool. With the reel on top of the rod handle and facing toward the angler, the rod-holding hand's thumb is placed on the spool to keep the line in check, and the free hand is used to depress the spool release, which disengages the gears and puts the reel in freespool. When thumb pressure is relaxed, line flows off the spool and out through the rod guides, carried by the weight of the object at the end of the line.

A few baitcasting reels (wide-spool versions) feature a click ratchet that signals when line is being taken off the reel; this can be used when a reel is not handheld or when it is left unattended. To retrieve line, the gears are engaged by turning the handle forward, which winds line onto the reel. A levelwind mechanism automatically distributes it back and forth across the spool.



The components of a Daiwa baitcasting reel and their interrelationship are evident in this composite image.

Every baitcasting reel has an adjustable drag mechanism, which is activated by turning a star wheel on the drive gear. This is located on the sideplate under the handle. The drag tension is set to the desirable level at the beginning of each day's fishing and relaxed at the end of the day.

These are the basic elements of operating a baitcasting reel. Some models have cast control and anti-reverse features; the size of the spool, the materials used, and the designed application of each product are also relevant.

Casting/Line Release Features

Controlling the flow of line off the spool is an important and basic element of use in all baitcasting reels and in all means of fishing.

Freespool. Disengaging the gears of a revolving spool reel so that its spool can freely turn backward and dispense line is known as putting the reel into freespool. When using a baitcasting reel, the angler simply depresses the line release clutch, which is also known as the freespool switch and is in the form of a button or bar. When the clutch is depressed, the pinion gear is disengaged from the spindle, which it drives. The reel is then in freespool; the gears are still intact but not the drive mechanism.

To permit quick, one-handed operation, the clutch is conveniently placed on the front (facing the angler) of most reels. This may be a contoured bar over the spool that bridges the sidewalls, or a switch that is recessed in the sidewall and permits the thumb to slide onto the spool. On some new reels and many older ones, the clutch is a button that is located away from the spool; you hold the reel in one hand and use your noncasting hand to depress the button.

A clutch bar (also called a thumb bar) is generally more convenient than a recessed switch. A bar gives you constant control of the spool because the tip of your thumb is on the spool while the heel of your thumb pushes the bar down. As long as the bar is properly situated, you only have a slight chance of accidentally hitting it and inadvertently putting the reel into freespool, which could result in disaster while playing a hard-fighting fish. (Incidentally, baitcasting reel manufacturers report that premature engagement of the clutch while the spool is still rotating at high speed during a cast is the single most damaging action to these reels.) A large-capacity reel that might be used for big fish and for trolling more often than for casting, and one where you might apply thumb pressure as extra drag, is better suited, however, to a side button.

When you depress the clutch of some reels, the levelwind line guide moves back and forth as line goes out. Others have a curtain line guide made of two bars that separate; this is no longer common, as it is prone to malfunction. The line guide of most reels remains in position until the handle is turned.

Spool revolution. When putting the reel into freespool, you must apply finger pressure to the spool to prevent line from paying out prematurely or haphazardly. Without this pressure, and assuming that a lure or weighted bait is tied to the end of the line, the weight at the end of the line would cause the spool to turn the moment the reel was placed into the freespool position, which could cause an instant backlash on the spool.

It is therefore necessary to place the thumb of the rod-holding hand on the spool so the spool can't turn; this is done instantaneously when the reel has a thumb bar or recessed switch because the thumb of the casting hand contacts the spool as it depresses this clutch. You must use both hands if the reel has a clutch button, keeping the thumb of the noncasting hand on the spool while you press the button with your other hand. The line can then be released by easing the tension or, in some instances by casting.

Spool braking/control. When releasing line without casting, thumb pressure is lessened on the spool to pay line out at a controlled rate; the objective is to let out the desired amount of line at a rate that doesn't make the spool turn so fast that it causes a backlash. This is important because a revolving spool can gather speed quickly and an uncontrolled spool can lead to a serious backlash in an instant. The backlash not only impedes immediate fishing effort because of the time required to undo it, but can also cause damage to the line.

This situation becomes even more acute when you use the reel for casting because the activity of casting builds up greater spool speed (spool speed in casting has been measured as high as 20,000 rpms). Casting requires very precise control of the revolving spool. In either application, it is necessary to brake the spool to slow its speed. The three means of controlling the spool when line is flowing off the reel during casting are mechanical, magnetic, and manual.

Manual spool braking is done by applying thumb pressure to the moving spool when casting. This is an action learned through trial and error and perfected with experience; it requires the application of different degrees of braking tension, depending on the weights on the line, distances being cast, and types of rods and reels being used. Although you can learn to use a baitcasting reel without applying thumb pressure, you cannot fish without some manual control at the time and with all reels, so it is something you must learn.

Mechanical spool braking is done by using centrifugal brakes (also called weights) to apply pressure to the moving spool. Reels with centrifugal brakes have blocks that must be engaged to effect spool braking. These blocks are usually found on the left side of the reel. They are accessed on some reels by removing the entire sideplate and on others by unlocking a quick-release bayonet cover

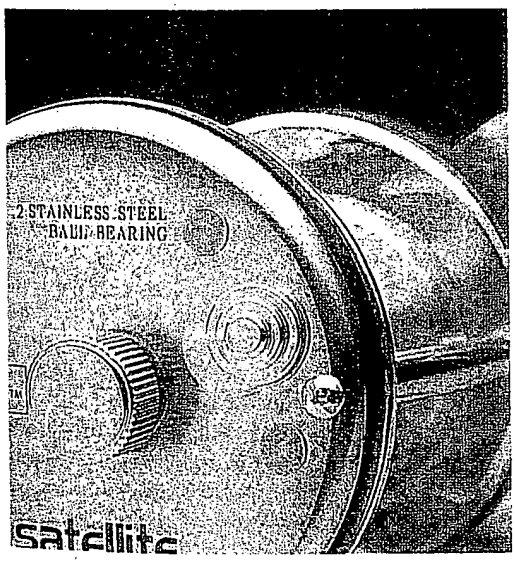
On the spindle of the spool is a cross pin with a centrifugal brake block on either side (some reels have a wheel-spoke system with four to six brake blocks). To be employed, these brake blocks must be moved out toward the spool flange and snapped into a notch. In this position they rub against the flange and apply centrifugal pressure to slow the spool and help avoid a backlash. The harder you cast (greater spool rpms), the harder the brakes work.

The centrifugal braking system varies with different products and manufacturers. Accessing this area is easy with most reels. Read the instructions that come with the product because some are supplied new with the brakes in the off position and some with the brakes in the on position.

These centrifugal brakes are used in conjunction with operating the spool tension knob. This device is a knurled knob or bearing cap on the sideplate where the handle is located, and it is adjusted by hand. Tightening this device puts tension on the spindle of the spool, but it is not purely a spool-braking device, as many people think. Its purpose is to control excessive end play, or sideways movement, of the spool, and its value in controlling spool braking is limited.

If the spool tension on a reel is too loose, there will be too much movement in the spool, and line could get behind it. If the engineering mechanics of a reel are correct, line should not get behind the spool; you should be able to loosen the spool tension knob completely and, although there will be excessive end play, you will not be able to pull the flange of the spool out of the centering ring of the sideplate.

As the spool tension knob on baitcasting reels is tightened, an interior wear plate rubs against the spool spindle. Tightening is usually accomplished in a clockwise motion, and the knob should be adjusted so that there is barely any perceptible sideways motion of the spool. Place your thumb on the middle of the spool and move it back and forth to see if you can move the spool. For general use, adjust the spool tension to a tight but not immovable tolerance.



The sideplate of this Marado baitcasting reel shows the spool tension control knob and the switch for a click ratchet, the latter being found on only a minority of such reels.

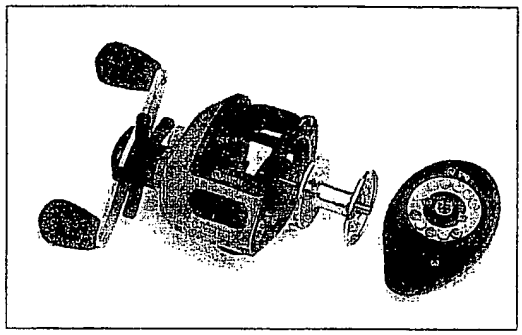
Spool tension needs to be adjusted according to the weight of the object being cast; in theory, if you switch frequently to lures of different weights, you should reset the tension each time. To do this when the reel is on the rod with line attached to a lure, hold the rod out and dangle a lure from the tip, place your thumb on the spool, and put the reel into freespool. Decrease thumb pressure and allow the lure to fall. Adjust the spool tension knob so the lure slowly descends to the ground when thumb pressure is relaxed. The spool should stop revolving at the instant the lure hits the ground. For continued long-distance casting, you may want to decrease spool tension and (if your thumb is well educated) put the centrifugal brake blocks in the off position.

Experienced casters tighten or loosen the adjustment knob, and employ this level of control in conjunction with an educated thumb. Newcomers to a baitcasting reel should start with a tighter adjustment at the outset to provide some assistance with spool braking, or they will be picking backlashes out with every cast. This tension can be gradually lightened as you become more proficient with thumb control.

Magnetic spool braking is a completely different system. It is common on the majority of reels from many manufacturers. Magnetic spool braking systems use a magnetic field to place variable degrees of force on the spool. A series of small disklike magnets are located in the interior of the sideplate opposite the handle. When an exterior magnetic control knob is turned, it changes the distance of the magnets from the metal spool; when the magnets are closer, more force is applied, and when they are more distant, less force is applied. Lower settings enable longer distance casts; higher settings help prevent backlash under adverse conditions, such as when casting into the wind.

While these systems are touted as "eliminating backlash," they are not foolproof, and if magnetic spool braking reels aren't used correctly, they will still backlash. They are, however, excellent for those who are learning to cast with this equipment when the proper settings are selected. Beginners should use a higher tension setting when they start; this will cut down on the distance achieved, but it is better to cast a shorter distance at first than to be frustrated by backlashes. With a little practice you can ease off on the tension and keep learning until you become comfortable with less tension.

Some of the newest magnetic spool control systems are very sophisticated and have the ability to alter magnetic force according to the speed of the



Removing the sideplate of this Zebco Quantum baitcasting reel allows spool changing and reveals the spool control magnets.

spool during the cast. This is different from most systems and is significant because spool speeds vary from extremely high rpms at the outset to lower rpms near the end of the cast. Variable-force magnetic systems automatically apply pressure according to the speed of the spool, which is essentially what an educated thumb is supposed to do. This type of system actually allows a spool to maintain its speed longer, meaning that it will result in longer casts. While a longer cast sounds good, the best benefit of this system is avoiding backlash without sacrificing accuracy. Thus, with some practice and experience, and with proper setting of the magnetic spool control on better reels with a variable magnetic control system, it is possible, strictly by using the magnetic control, to cast without having a backlash.

It should be noted, however, that no matter how sophisticated these magnetic anti-backlash systems are, many expert anglers are very comfortable with, and continue to use, baitcasting reels without this feature. The late 1990s saw a resurgence in high-end premium baitcasting reels, very few of which had a magnetic spool control feature. If you only use a baitcasting reel for noncasting activities, you don't need magnetic spool braking; most saltwater anglers who use baitcasting tackle do not use reels with magnetic controls because of the likelihood of corrosion.

Incidentally, baitcasting reels usually do not have both centrifugal and magnetic cast control systems. It's one or the other. In both systems, however, you still use the spool tension adjustment in conjunction with the centrifugal or magnetic spool braking.

To set up a reel with magnetic spool control for casting, begin by adjusting the spool tension knob as previously detailed, starting with the magnetic control at the lowest setting. Once the mechanical tension knob is adjusted, turn the magnetic setting from zero to an appropriate level, make a few medium-intensity casts, and adjust the magnetic control up or down as necessary before you start serious casting. Slight thumb pressure on the spool is advisable when starting with low magnetic control, but you can apply less pressure than you would if using only mechanical braking. Complete beginners should set the magnets at maximum level until they get proficient at releasing the lure and applying thumb pressure.

A more detailed explanation of the entire backlash issue, especially the phenomenon that causes it, is contained later in this entry.

Flipping feature. Many baitcasting reels have a selectable switch that automatically engages the pinion. This is known as the flipping switch because it is primarily used in this method of bass fishing, which requires specialized short-distance casts *(see: flipping)*. It can also be employed, however, by anglers who use bait and need to let a fish run when it takes the bait offering.

With this switch on, the reel is out of gear only when the thumb is kept on the freespool bar. When you release thumb pressure, the reel is instantly in gear. The advantage is that you don't have to turn the handle to put the reel in gear. Because the reel is already in gear when a fish takes or when the line tightens, no time is wasted setting the hook. The kind of fishing and the techniques you use really determine whether this feature is necessary.

Retrieving/Line Recovery Features

Line pickup. To be in a position to set the hook and to return line to the spool, some drag tension must be established and the gears must be engaged. Line is retrieved by rotating the handle, which drops the pinion gear onto the spindle and engages the drive mechanism. As long as there is some drag tension in effect, turning the handle will revolve the spool, bringing line onto it.

Left/right retrieve. The great majority of baitcasting reels are set up only for right-handed retrieve and are not convertible. Although right- and left-handed anglers have been using this system for many decades, it favors the minority of people who are left-handed. A few reels are available with left-handed retrieve, but these are not nearly as accepted in the marketplace as right-retrieve reels.

Despite the fact that right-handed anglers have become accustomed to fishing backward with baitcasting reels, it is theoretically beneficial for people who are right-handed to reel with their left hand and for lefties to reel with their right hand, so that the dominant hand is the one that holds the rod and is used to play the fish or direct the retrieve. This is especially significant when frequent casting is involved, as is usually the case with baitcasting tackle. The dominant hand is used to cast the rod, so there is no need after casting to take further action to start using the reel; the other hand is immediately placed on the reel handle grip and turns the handle. This lack of time delay is important in some fishing situations.

Making a well-executed cast and getting the lure precisely on target, for example, is often not the end of the casting action. When angling in some places and using lures that sink, you have to be able to start

fishing them the instant they hit the water, or they'll get tangled or snagged on objects in the water. A spinnerbait worked very shallow is an example of a lure that should "hit the ground running."

Left-handed baitcasters who retrieve with their right hand and right-handed baitcasters who retrieve with their left hand will have little trouble if they thumb the spool properly and get cranking the instant the lure touches down. Such anglers are in the minority, though; most users both cast with their right hand and retrieve with their right hand, meaning that they switch the rod and reel from right to left hand at some point.

Most good casters become adept at making this transfer while the lure is in flight, taking their right thumb off the spool just as the lure touches the water and then quickly grabbing the reel handle and cranking before the lure has a chance to get deep. This takes fine timing and is an oft-overlooked aspect of baitcasting technique. You must master this (or learn to cast with your other hand) in order to effect the best possible retrieve under certain circumstances.

As mentioned, there are some left-retrieve baitcasting reels. Most of these are flip-flopped copies of right-retrieve reels, although at least one company has recently produced a distinctive left-retrieve reel that has a rearward handle (instead of forward on all other reels) and a top-mounted line release that are meant to reduce the awkwardness of right-handed casting and left-handed reeling.

If you are new to baitcasting and are right-handed, you should consider getting a left-retrieve reel because you don't have old habits to break. If you're already accustomed to casting a spinning outfit with your right hand and reeling with the left, this is the same principle. Many new right-handed baitcasters have found it worthwhile to start out with a left-retrieve reel and continue with it (left-handed anglers can simply use the many standard right-retrieve reels).

Many experienced right-handed baitcasting users, who are already used to reeling right-handed, have found it difficult to make the transition to left-retrieve reels, however, especially when fishing with various outfits during a day. From a practical usage standpoint, owning both right- and left-retrieve baitcasting reels becomes more gear-intensive than most people like or can afford. The obvious answer is a convertible reel, but none are presently available.

Line winding/levelwind. Line is wound directly onto the spool of a baitcasting reel, but it is not necessary to manually level or disperse that line across the spool. All baitcasting reels have a mechanism known as a levelwind that automatically disperses line evenly across the spool. The levelwind may be gear-driven by the spool or by the main gear; it turns whenever the spool revolves, both forward and backward. It is located in a carriage that spans both sides of the reel. Inside is a nylon idler gear that turns a worm gear and catches a pawl that moves the line guide back and forth across the spool to distribute the line evenly, which helps eliminate line buildup.

Most winding lays line on the spool evenly in side-by-side wraps, but some reels use a cross-wrapping wind. The cross wrap helps with some lines, especially slick thin-diameter microfilaments, which have a tendency to dig deep into side-by-side wraps when subjected to severe tension.

Virtually all mass-produced baitcasting reels have featured a levelwind mechanism for many years. Only competitive tournament casters are likely to have a small revolving-spool reel without a levelwind, and that for distance events.

This brings up an interesting issue. The levelwind line guide contacts the line when it is cast and when it is recovered. Although a levelwind has great merit for constant cast-and-retrieve fishing, it has some drawbacks that most people do not realize. One of these is that it reduces casting distance. The reduction may be slight for the average angler, and is compensated for by the use of less resisting materials on the line guide. Levelwind line guides are made from many different materials. Some, and especially the old standards and large-spool models, have a long open metal guide; in others, the guide opening is narrow and made of ceramic, titanium, or aluminum oxide.

Line speeding off the spool on a cast contacts the spool by one of several methods. On a few baitcasting reels, the levelwind guide moves freely back and forth in its carriage when the line is outgoing (high friction); this is preferable to others where it does not move at all when line is outgoing or moves to a center position and stays there (both of which cause more friction when line comes off the edges of the spool).

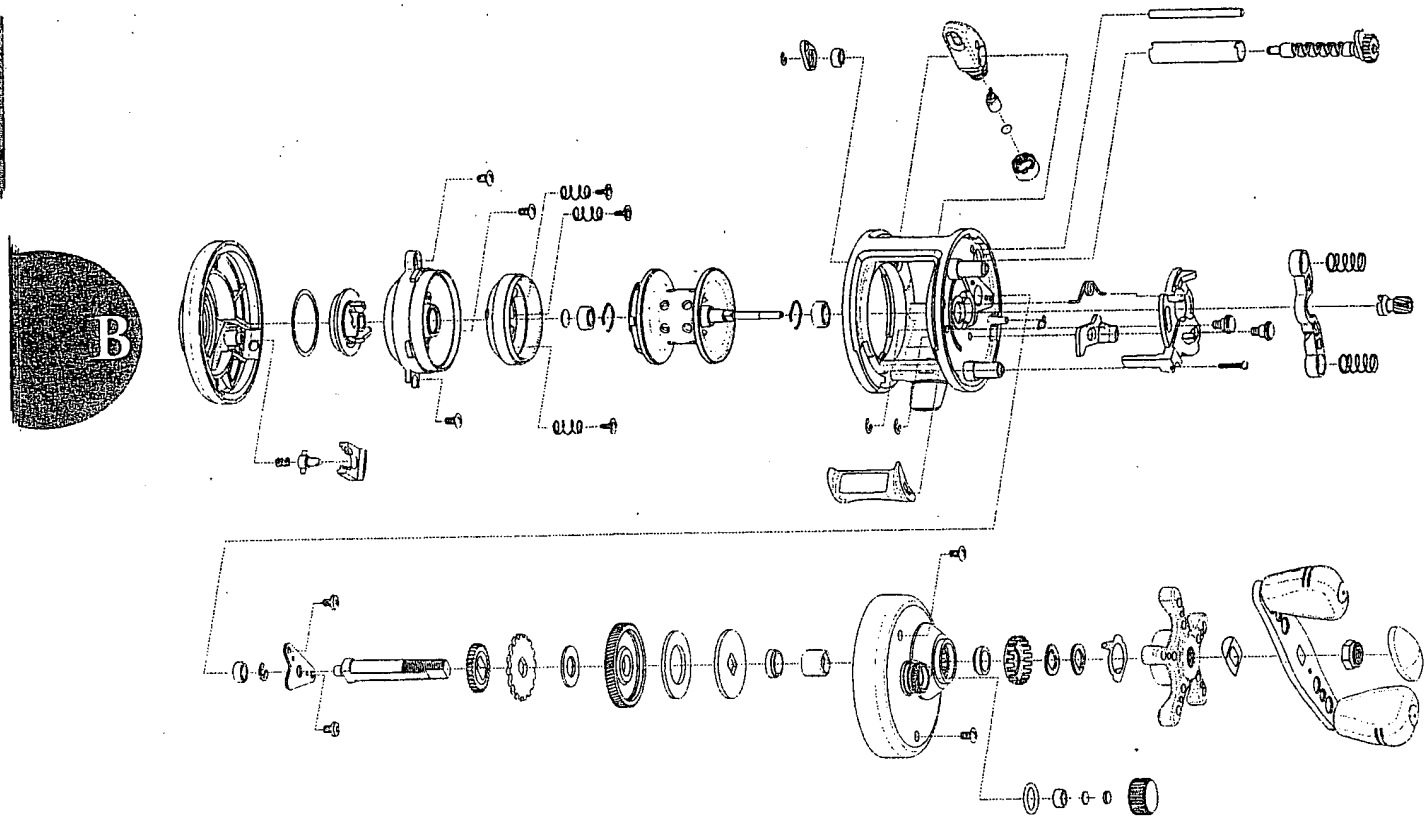
The other drawback is that the carriage is prone to getting grit, dirt, and sand in it, which can hamper smooth use or cause the carriage to malfunction. Many saltwater anglers are skeptical of the levelwind and view it as a likely problem, if not because of sand then because of corrosion. Proper care and washdown of a reel should minimize this problem in good quality reels.

Gears. The most basic part of the operation of every reel is the gear set. In baitcasting reels, this is generally stronger and more efficient than that of a stationary or fixed-spool reel because the gear set operates on a parallel axis.

In a baitcasting reel, a large gear, the main or drive gear, engages a smaller gear, the pinion. The drive gear is linked to the reel handle, and the pinion gear connects to the spool. This system provides the multiplying gear ratio for ample line retrieval rates with a small spool and still delivers substantial cranking power. It also allows for the use of heavy lines.

Most baitcasting reels have pinion and main gears that are made from the same material, such as

In March of 1882, an estimated 1.4 billion tilefish were found dead on the Atlantic Ocean surface, covering an area 25 miles wide and 170 miles long.



Shown are all the parts of a Quantum baitcasting reel, which includes a one-piece aluminum frame, centrifugal brake, three ball bearings, and continuous anti-reverse.

a hard brass. Some of the better quality baitcasting reels have dissimilar materials, such as a bronze pinion and a brass main gear. Very few have a stainless steel pinion gear and a bronze main gear (which is common on conventional reels). Unless one gear is slightly softer than the other, problems can arise.

In almost any simple gear set, one gear material should be different from the other. Use of the same materials tends to cold weld, or "gall" together; dissimilar metals nearly always offer the lowest coefficient of friction. The presence of an oil film helps to reduce friction. Use of dissimilar metals and an oil film ensures that gears run smoothly for a longer period of time.

The best situation is for the main drive gear material to be slightly softer than the pinion gear for wear characteristics, especially in reels that are used often for demanding applications, and where the gear ratio is high. In a multiplier reel (such as a baitcasting or conventional reel), one tooth of the pinion gear contacts its mating teeth on the main gear the same number of times as the gear ratio. That is, in a 5:1 ratio reel, each tooth on the pinion gear is activated five times more often than its counterpart on the main gear. Therefore, it is subject to five times the wear and needs to be harder simply to survive. Use of harder materials on the pinion gears produces a hardness differential that favors the smaller diameter pinion gear and provides longer life.

Gears are made to work in a given way with respect to each other, so there must be a certain distance between the two to match up; otherwise the gears will feel tight. Naturally, the gear teeth must be machined as precisely as possible to assure smooth operation and long life. Some reels, especially those with a higher gear ratio, have helically milled gears. This means that each gear tooth is spiral or curved, rather than straight, on the gear circumference. Helical milling results in increased contact area, greater strength, a thicker cross section, and a high degree of inherent smoothness, particularly for smaller gear teeth. The major benefit is that, unlike straight-milled gears where only a single gear tooth is fully engaged at one time, helical gears allow at least partial engagement of several gear teeth at all times, spreading the load and potential wear. This is mainly an issue where the gear teeth are small, as is found on higher ratio models, and there is less surface to make contact.

The high-stress cranking that is experienced when using baitcasting reels with some methods of fishing (such as using hard-pulling lures and landing strong fish), requires a rigid support system, so that under great duress there is no flex to affect the inner workings of the reel. The use of heavy line, and cranking large fish in extreme conditions, can put tremendous stress on all components. Both the material and construction of the frame and shaft

supports are what keep the gears precisely located and delivering long life.

Gear ratio. Because the drive gear is linked to the reel handle and the pinion gear is engaged with the spool, the basic numerical ratio of the drive and pinion gears in a baitcasting reel merely establishes the number of revolutions made by the spool per turn of the handle. That number is determined by counting the gear teeth on the larger drive gear and dividing that by the tooth count of the smaller pinion gear. In a gear set consisting of a 53-tooth drive gear and a 10-tooth pinion gear, the ratio is calculated at 5.3:1, because the pinion will turn 5.3 times for each full rotation of the drive gear.

Gear ratios are generally categorized as high (fast) or low (slow), but this is relative to the type of reel and application. Furthermore, the size of the spool may be such that a low gear ratio reel actually recovers more line per full turn of the handle than a high ratio reel with a smaller spool. Typical low gear ratios for a baitcasting reel are about 3.8:1, and typical high gear ratios are from 6:1 to 7:1; most high gear ratio baitcasting reels are between 6:1 and 6.3:1. If numerical ratio were the only factor of comparison, what is low or somewhat low for many baitcasting reels would be high for nearly all conventional reels. In a baitcasting reel, a high gear ratio may be preferable for cast-and-retrieve fishing with lures that do not pull hard, but a low (or at least lower) gear ratio reel is preferable for hard-pulling lures. What is gained in retrieve speed is lost in cranking power.

The higher the ratio, the greater the potential for stripping gears under severe strain. On a high gear ratio reel, the individual teeth become narrower because more teeth are fitted into a given area and they are weaker. An inexperienced angler is more likely to do damage on a high gear ratio reel when he puts the smaller gear teeth under a heavy load. Fishing with a high gear ratio reel requires using the rod a lot, pulling it back and then winding line onto the spool quickly on the downstroke. This is necessary because, with high gear ratio reels, the smaller tooth configuration does not have sufficient cranking strength. This is a factor in all reels but obviously of more concern with reels that get a heavy load.

Cranking power. Gear ratio and cranking power are inextricably linked in all reels, and most affect how easy or difficult it is to retrieve a heavy weight or an object that offers a lot of resistance. Reels that can easily handle a heavy load are said to have a lot of cranking power. There are various factors that affect this.

The length of the handle has a bearing because length is a factor in the amount of leverage you can put on the handle. The longer the handle, the more leverage, and the easier it is to retrieve a set load. If you make a handle longer, you reduce the force at the knob. It is essentially the same principle as having a long-handled wrench; it's easier to loosen nuts with a long-handled wrench than with a short-handled one. So a longer handle equates to greater power (although your hand and arm must describe a larger circle to operate the reel).

The gear set itself is also a big factor with regard to cranking power. If you have a baitcasting reel with a gear ratio of 3.8:1, then it's easier to retrieve a load because this is a low gear ratio. If you have a baitcasting reel with a gear ratio of 6.2:1, which is high, it's much more difficult to retrieve a load, although you get more speed. If you're retrieving something that offers very little resistance, the high gear ratio is okay. You need a lower gear ratio, however, for something that offers more resistance. Thus, the lowest gear ratio reels have the greatest cranking power, and the highest gear ratio reels have the least cranking power.

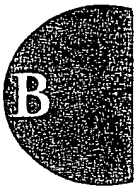
Naturally, there are times when you want the best of both extremes. Some baitcasting reels have two-speed operation: in essence, the ability to switch between a higher and a lower gear ratio. In these two-speed baitcasting reels, gears are changed by moving a knob or lever. Most people who use these wind up doing nearly all of their fishing with the high-speed mode (6:1) because the low speed (3.5:1) is just too slow for retrieving most lures.

Regardless of the gear ratio, the evaluation of a reel's ability to retrieve line should boil down to something engineers call Inches Per Turn of the handle, or IPT. This is the amount of line recovered per turn of the handle or, simply, line recovery, which is a better measurement of retrieval ability than gear ratio. Line recovery is determined by spool diameter, which is a key dimension for any reel and which sets the circumference of the line level on the spool and the amount of line wound onto the spool with each turn of the reel handle.

When the level of line on a spool is low, as it might be when a strong fish takes a lot of line, less line is recovered per turn of the handle than it would be when all of the line is on the spool. Similarly, the amount of line recovered per turn of the handle of a fully spooled 4:1 ratio reel that has a small spool is less than the amount of line recovered per turn of the handle of a fully spooled 4:1 ratio reel that has a large spool.

Thus, the amount of line recovered is the measurement an angler should be most interested in. Yet anglers cannot quickly determine line recovery when evaluating a reel they might purchase because specifications on the circumference of the spool are seldom provided on the reel or in the packaging materials. You may know, for example, that in a 4:1 ratio reel one revolution of the handle puts four wraps of line on the spool, but if you don't know how much line is gained with each complete wrap, you don't know the actual recovery. (In a reel that you own, of course, this can be determined by marking the line and then measuring it.)

For a greater discussion of this subject, *(see: gear ratio)*. Although most people have a notion that



Wild freshwater fish with low levels of fat and calories include yellow perch, walleye, pickerel, and crappie; high levels belong to chinook salmon, rainbow trout, and lake trout.

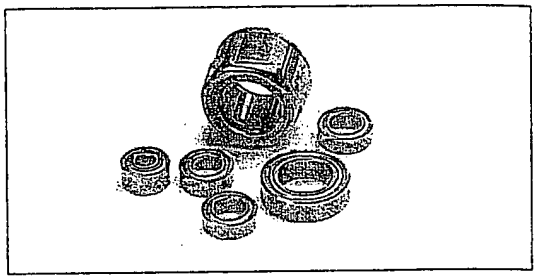
gear ratio is of primary importance in retrieval and some think that the higher the ratio the better, other factors are involved, and line recovery is a major one. Remember, however, that reels with a low gear ratio do better under heavier loads, whether those loads are due to the size of the fish or the type of equipment being used (heavy weights, deep-diving lures, and so on).

This issue is most critical in baitcasting reels that are used in hard or heavy duty applications. Chances are, the bigger the reel the more likely it is that a heavy load will be placed on it. The larger the reel, the more noticeable the effect of a high gear ratio, so you'll feel that load a lot more.

Handle. The length of the handle affects cranking power, so the distance from the center of the gear stud to which the handle is attached to the handle knob is a key element in retrieval. A long handle equals power, yet many people have the misconception that a long handle also equals speed—that the longer the handle, the faster it can travel. The opposite is true. The longer the handle, the greater distance the cranking hand must travel with each turn. The shorter the handle, the quicker it can be turned, but there's less power, so there's a trade-off either way. You can't get power and speed simultaneously. All baitcasting reels have dual-grip handles, which provide a counterbalancing effect and easy grabbing of the handle without having to look at it. A baitcasting reel grip or knob is mainly grasped with the fingertips and operated by wrist motion, and is not affected by the presence of a second handle knob. There are various styles of grips. Most have a contoured, textured, paddlelike surface with grooves, which is quite comfortable; many are round, which is traditional. The size of the knobs and the handle is often a problem for many people who have long fingers and large hands. The smaller baitcasting reels seem designed for small hands and are not comfortable in a large hand when used for a considerable period of time.

Ball bearings/bushings. Bearings and bushings provide a way to minimize friction on rotating shafts. Bushings don't spin as freely as ball or roller bearings, which are typically viewed as durable and reliable and a way to add rotational freeness to the retrieval system. A bushing can deliver as smooth a retrieve as a ball bearing under low load conditions, but under heavy loads, ball bearings are vastly smoother and more durable.

One to four stainless steel ball bearings are used on many baitcasting reels, primarily on both ends of the spool shaft and on the crankshaft. Some reels have only one ball bearing and a bushing on the end of the spool shaft. It is possible to have up to 11 ball bearings in a reel, including one on the cap area of the shaft, one on each end of the worm gear, and two on each handle knob. They are unnecessary in most of these places, however, and drive the cost of the reel up; the most that baitcasting reels have is six or seven ball bearings. The most noticeable value



Six stainless steel ball and roller bearings from a premium baitcasting reel.

of ball bearings is the smooth operation of the spool. Ball bearings are, or should be, of the highest grade to provide the most benefits. For a more detailed review of ball bearings and bushings, *see: Reel, Fishing.*

Warning click. Known simply as a click or clicker, this is a ratchet device that is primarily intended to let an angler know that line is going out. It is only found on a small number of baitcasting reels, usually the larger wide-spooled models.

The warning click is generally used when a rod and reel have been placed in a rod holder (for instance, when trolling or baitfishing) and is not handheld. In some situations, as when fishing with bait, the reel is placed in freespool with the warning click on so that, if a fish picks up the bait, the line is free to move with minimal resistance yet without risking a spool overrun. In other situations, such as when trolling, the gears are engaged and the warning click is employed so that it instantly alerts an angler (or mate or boat captain) to a strike and to the fact that a fish is on and taking line off the reel.

The click itself features a spring-loaded tongue that moves back and forth against ratchet teeth to make this sound. It is activated by moving a small off-center button on the sideplate (usually the left sideplate). The click is intended for part-time rather than full-time use, and the click button should be disengaged when retrieving. Continued use of the click causes premature ratchet wear. Some people view leaving it on as a sign of an inexperienced angler, although some charter captains like it to be left on because the sound lets them know what a customer's fish is doing; when the clicking sound speeds up, for example, the fish is taking line. Some captains have even asked manufacturers for different types of sounds in the click. (This is especially prevalent in the Great Lakes, where the clicks are always used for trolling.)

Drag Features

The purpose of the drag function on any reel is to let line slip from the reel at varying pressures when force is applied to the line. It serves as a sort of clutch, or shock absorber, and is especially important when using light line, when playing large and strong species, and when fish make strong and sudden surges while being landed. If an angler never catches large fish, only uses heavy strength line, and

is content to wind fish in, then it is conceivable that the drag will never be used.

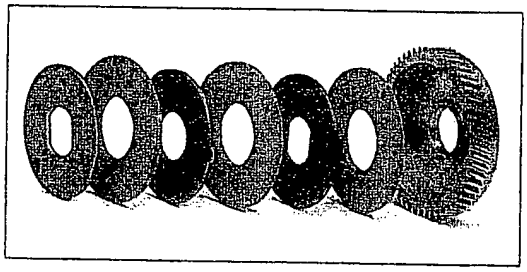
Many people who use baitcasting tackle do not use the drag very often. Many bass anglers, who are major users of this tackle, seldom use the drag, or they tighten it down so that they cannot use it. This is not a good idea, however, as it defeats the purpose of this feature altogether. Those who do use the drag on baitcasting reels are anglers who generally fish with lighter strength line; those who catch big steelhead, salmon, catfish, pike, muskies, and stripers; and those who use baitcasting tackle for various saltwater species.

Catching large fish, which weigh more than the actual breaking strength of the line or that can apply extreme pressure on the tackle, requires some finesse rather than sheer strength. This means that the drag will come into play because if it doesn't, the force will exceed the strength of the line and the line will break.

When the drag comes into play, it allows the fish to continue applying force but at a pressure that is less than the breaking strength of the line. When the force reaches a certain level (usually a specific percentage of the line's breaking strength), a properly set drag mechanism turns the spool and allows line to slip from the reel under tension. In essence, this means that a fish can run instead of engage in a tug of war. The fish must work for the line it takes off the reel, however, which tires the fish and helps the angler subdue it.

Many people mistakenly think that they need to set the drag very tight for effective hook setting. When you have 20 yards of line out, and you have rod flex, line stretch, and the dampening effect of the water to contend with, you don't need very much drag force at the reel. You cannot exert the maximum pressure when you set the hook. When you set the drag pressure at or near maximum force, once the fish is close to the boat and less contribution is made by line stretch, rod flex, and water, having the drag locked down may mean that the line cannot absorb the sudden shock of a quick run, even from a fish whose weight is less than the breaking strength of the line. People are often amazed that a 15-pound fish can break 20-pound line, but that doesn't happen if the drag is set properly and the washers are allowed to slip freely when necessary.

In typical fishing with baitcasting reels, anglers set the drag at 25 to 30 percent of the breaking strength of their line. Some people measure this with a short length of line on a straight pull off the reel. Others measure it with line running through the rod guides and the rod flexed as it would be in fishing circumstances. Most people use the "feels good" method of establishing drag tension by pulling line off the reel and adjusting the star wheel until the tension feels right. The most precise way to measure drag tension is by using a reliable scale and attaching it to the line. No matter what method is used, the objective is to adjust the drag so that the line will not slip until the appropriate amount of tension is applied. Understanding how to use and set drag is one of the most important aspects of sportfishing; it is thoroughly reviewed in detail elsewhere *(see: conventional tackle; drag)*, so that information will not be repeated here.



This drag stack from a top-quality baitcasting reel has three friction washers interspersed between three metal washers, the latter keyed into the main gear and gear stud.

It should be noted, however, that on baitcasting reels the drag is located on the main gear and is usually a multi-element system with washers that are keyed together to increase the working surface area. Different materials are used in the friction washers; a popular one in some better reels now is graphite-impregnated Teflon. Drag tension is increased or decreased by turning a drag star (radial-arm star wheel), which is located under the handle on the sideplate. The drag star threads onto the gear stud or drive gear, which is connected to the handle, so it rotates concurrently with the handle without affecting the setting.

Turning the drag star clockwise or forward increases tension; turning it counterclockwise or backward decreases tension. When spool friction exceeds the tension on the line, the reel handle turns the main gear and the spool, and allows line to be recovered. When tension on the line exceeds friction on the spool, the spool revolves against handle pressure, and line can be pulled off the spool. The handle is prevented from turning backward by a dog and ratchet, which is known as an anti-reverse.

This system eliminates the possibility of line twist due to turning the handle when line is flowing off the spool, which is a major contributor to severe line twist in fixed-spool reels. On a baitcasting reel, twist isn't possible if you're cranking the reel handle and the drag is slipping at the same time. There is no line twist unless it comes from the lure use or you put it on when the spool is filled.

The range of drag tension adjustment is somewhat more limited on baitcasting reels than spinning reels, although it looks like more because of the star wheel knob. With these products, it is often the case that a smooth drag and the ability to fully lock down the reel (so the spool cannot turn backward) are not compatible, although better baitcasting reels do have good drag systems with a wide range of adjustment.

B

Anti-Reverse Features

The anti-reverse component of reels is an element that restricts backward movement of the handle. In most baitcasting reels a dog and ratchet mechanism provides a variable amount of backward handle movement; this is a multi-stop anti-reverse. The amount of this movement is decided by the number of ratchets for the dog to catch. In some reels it is a one-way roller bearing that allows no backward movement and which is called continuous or infinite anti-reverse.

This feature is especially relevant to cast-and-retrieve applications and to some styles of bait-fishing, primarily because it is relative to how the reel operates when the forward-turning motion is stopped. There is a natural tendency to pull up on the handle when not reeling, whether to set the hook or to momentarily stop while retrieving. If there is considerable play in the handle and drive gear when the reel stops, the handle may actually turn backward slightly. This produces a feeling of sloppiness or instability, and too much backward movement of the handle may adversely affect hook-setting. Ideally, a reel used for casting should engage instantly and firmly. Many of the better baitcasting reels have a continuous anti-reverse that keeps the handle and drive gear from moving even the slightest bit backward.

The number of ratchets in the system is one factor that governs how quickly the drive gear engages in a reel with multi-stop anti-reverse. The ratchets are little stops for a dog; as you turn the handle, this part slides over a ramp, and when the dog stops moving, it slides backward and engages a ratchet. The greater the number of ratchets, the quicker it engages; 10 ratchets, for example, mean 10 stops per turn of the handle. More ratchets also mean finer teeth, which are easier to break or clog.

In theory, more ratchet stops could pose a strength problem because you're depending on more ratchets with less material backing to stop the force of the hookset. This seems as if it could be a problem when using low-stretch lines and when using line that is overmatched by strength for the reel. Fewer ratchet stops, however, may be worse because that provides perhaps an extra 4 or 5 inches of rod tip movement when you set the hook before you take up the slack and engage the dog. With a hard hookset using strong low-stretch line and a tight drag, you can develop a lot of force and strip the dog and ratchet system when there is this much rod tip movement.

In a trolling application, where baits or lures are always set out under a fair load, when you have a strike you are already in a position to respond without any backward movement of the handle regardless of the number of ratchets. So in this application there is no relevance. In a casting application, where it is undesirable to have backward travel of the handle when you set the hook, more ratchet stops are advantageous for quick hooksets. A one-way roller bearing, which provides continuous anti-reverse, however, is most desirable. Some baitcasting reels have an optional anti-reverse feature, which means that the anti-reverse can be disengaged so the handle and the spool can be turned either forward or backward. This is accomplished by moving a small spring-loaded lever on the sideplate (usually the right sideplate or handle sideplate). This may be referred to as a direct drive feature, although it is actually a mechanism for disengaging the anti-reverse.

This feature is often preferred for specific fishing applications when anglers want a direct feel of the line for strike detection, for instance, when they are drift fishing and putting the reel in and out of gear frequently, or when they are live-lining bait and want to let line out frequently to follow the movement of the bait. After casting, engage the gear by turning the handle, then disengage the anti-reverse. When a fish takes and runs off, flip the anti-reverse lever into the on position and set the hook. If you leave the anti-reverse disengaged, the reel handle will be free to move wildly backward as line comes off the spool, which could cause trouble. Make sure to keep your hand on the handle if you have the anti-reverse disengaged, or you'll have a runaway handle.

Other Features

Spool. Many people believe that narrower baitcasting spools are easier to cast and to attain distance with than wider ones, but this is a function of many reel elements and not an absolute determination. It is reasonable to believe that there is less friction on the line from the levelwind line guide during a cast because the line comes from less of a side angle when it's at the ends of the narrow spool. Narrow spools are smaller and also lighter, requiring less effort to get them moving, and they are very suitable for lightweight lures. Narrow spools also have less capacity, however, and when there is a lot of line out, it takes more work to recover line when the handle is turned. Wider spools also tend to be used with heavier lures, which provide more momentum in a cast, thus allowing for good distance, all other things being equal.

For a time there was a trend toward narrow V-shaped spools in baitcasting reels; very few of these are still produced because they tend to bunch the line, which impeded smooth outward line flow. Nearly all spools today are level from edge to edge, and capacity is determined by the width as well as the depth.

Many anglers do not need significant line capacity on a baitcasting reel, and most have more line capacity than the average caster needs, even with a thicker diameter line. Some hold just 100 yards of 10-pound test, but most hold about 150 yards of 12-pound line, and some large models hold more than 200 yards of 20-pound line. Naturally, this is

relative to line diameter, which means a reel that holds 100 yards of conventional-diameter 10-pound line might also hold 100 yards of 17-pound line that has the diameter of a conventional 10-pound line *(see: line)*. Although not all reels have this feature, line capacity information, provided on the sideplate of many reels, is very helpful.

Incidentally, baitcasting reels are primarily used with 10- to 20-pound strength line. Some high-quality light models are suitable for use with 8-pound line and possibly with 6; some sturdier models are used with 25- to 40-pound line for special situations.

A recent trend is toward a shallower arbor on a wide baitcasting spool. The smaller depth means that the reel holds less line overall, but because these have less mass in the core region, they are lighter; this means it takes less effort to move the reel on a cast, so they cast very well. For use with light lures and special short-casting situations (bass anglers like this for pitching, *see*), this can be beneficial. Some spools are also perforated to decrease their weight. This also helps because, in general, a lighter spool requires less momentum to start turning, plus it doesn't have the inertia to keep it going, so it's easier to handle, especially for casting light lures.

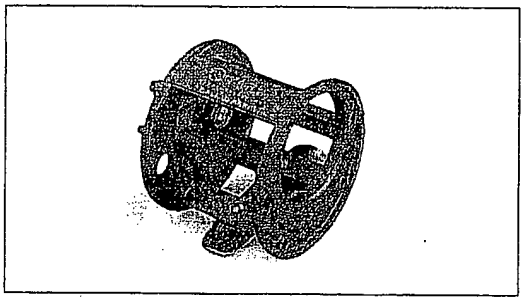
Spools are primarily made of aluminum. Some of the best and higher priced reels have aircraft grade aluminum, and some of the lower end reels have graphite spools. Though lightweight, graphite spools are of dubious value for hard-core fishing with baitcasting reels. They are uncommon in conventional reels, which take much more punishment than the average baitcasting reel because they are frequently broken when subjected to extreme tension and the use of heavy line. A greater discussion about revolving-spool materials and properties is contained with the entry on conventional tackle *(see)*.

One other thing worth noting is that the spools of modern baitcasting reels are very easy to access for changing or to adjust the centrifugal brake shoes. Many reels now feature bayonet-style access to the spool; this is flush to the exterior sideplate that is opposite to the handle, and hands-down the quickest system for spool changing. Such a design is one of the best creations of manufacturers and eliminates the protruding finger-grip screw heads that exist on other reels. Actually, the majority of reels still feature relatively quick access via two or three screw heads that are located on the handle sideplate and which, when completely loosened, detach the entire opposite sideplate or (most commonly) the handle sideplate to provide spool access.

Because spool changing is not that common, most people never use this feature, although they may need it for easy access to the spool for adjusting the centrifugal brake. Rather than changing spools to use their outfit with different strength line (which means derigging and rerigging the same outfit), most anglers simply have multiple baitcasting outfits.

Frame. The weight, material, and construction of the frame can make a difference after many hours of use, and especially depending upon the severity of use in casting, retrieving, and playing fish.

The materials used in the frame and sideplates vary widely. They include one-piece forged aluminum spools on premium reels, as well as one-piece die-cast or machined aluminum and one-piece graphite models. One-piece frames provide superior strength and precision alignment of the spool and other components. One-piece aluminum frames are especially favored for heavy-duty applications; baitcasting reels used for lighter applications may have a multi-piece frame.



A one-piece aluminum frame on baitcasting reels has strength and torque-free advantages, and provides the best possible gear alignment.

Multi-piece frames are also made of aluminum, graphite, and even plastic. Plastic frames are not durable enough for serious use. Graphite frames are generally adequate for most casting activities; graphite has weight and corrosion advantages over aluminum, but even the latest grades of graphite do not yet have the strength of properly manufactured aluminum, so it is not quite as resistant to torque or flexing. Thus, subjecting a graphite reel to a great deal of pressure could result in deterioration in the gears. This is why some reels have a graphite sideplate and an aluminum frame and spool; the weight of a reel with a multi-piece frame can be reduced if the sideplates are graphite, and these do not have much effect on overall strength. Only one sideplate on a reel has a one-piece frame; this is the handle sideplate and it is made of the same material as the frame.

All frames have a reel foot attached to them; this component sits in the reel seat of a rod and may be integral to the frame or riveted on. Riveting is less preferable because rivets can get loose and can't be tightened.

Ergonomics. The shape and weight of baitcasting reels is especially important because these products are either frequently or exclusively used for casting by many anglers. Baitcasting reels were once entirely round in design, but they are now ergonomic, with low profile and teardrop designs very common in addition to round models. Teardrop reels are especially favored by anglers who

tend to palm the reel, so a smooth sideplate that cups neatly into the palm of the rod-holding hand is quite popular.

Although weight is a major concern of manufacturers, this is (or should be) subordinate to having strength and durability. The majority of baitcasting reels weigh between 9 and 12 ounces. Some are between 7 and 9 ounces and mini versions with plastic bodies may weigh less, while large-spool versions may weigh up to 21 ounces. Light weight can make a difference after many hours of use, but so can comfortable styling. A comfortable shape may be more important than overall weight, especially if just fractions of an ounce are involved. If you do not palm the reel when holding it, however, lower weight is probably preferable to shape.

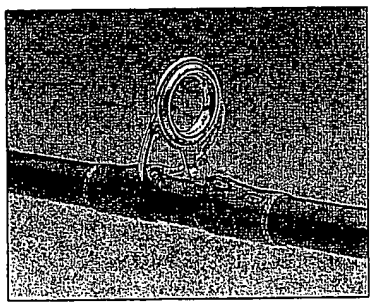
Manufacturers would like to make lighter baitcasting reels, but have not completely figured out how to do it without making disadvantageous sacrifices and compromises. Furthermore, light and ultralight versions of these products have not caught on as well as larger versions, which dominate the market.

Cosmetics, or appearance, has nothing to do with function and doesn't have practical use implications. Handles do have a bearing on comfort and ease of use. Some people like bigger handles than are supplied by the manufacturers and some prefer smaller, and these can be changed. The other aspects of handles relative to speed and power were discussed previously.

Lastly, an overlooked item of convenience, or in many cases inconvenience, is that of threading line from the spool out the line guide or spooling it onto the reel for the first time. It's difficult to put line on many modern baitcasting reels because of the number of bars, narrowness of the spool area, and presence of a reel hood. Many hoods pop up to provide access to the spool for putting line on or for picking out a backlash, but these hoods are more of a nuisance than a help. Round reels with an open metal line guide and medium-width spool are the easiest to handle when putting line on, getting it through the line guide, and picking out a backlash.

Rods

As with most types of rods other than spinning and flycasting, baitcasting rods have guides that mount over the axis of the rod and are placed on top of it, with the reel sitting on top of the handle rather than under it. This arrangement, which is necessary because of the nature of baitcasting reels, is especially well suited to fighting and controlling a fish, as well as for retrieving lures. In a general sense, fighting fish is what this tackle does particularly well; therefore, since the load of a gamefish on the line applies both a crushing downward force on the guide ring and frame, and a simultaneous tendency to torque or twist the rod, guides have to be of top quality and properly spaced and placed.



Guide rings on baitcasting rods have a smaller diameter than those on spinning rods; this is a double-foot guide.

The rings on baitcasting rod guides are smaller than they are on most other tackle because they don't have to accommodate large spirals of line coming from the reel when casting (as in spinning), the line is fairly close to the rod blank when it leaves the reel, and the line is not prone to twisting and coiling on baitcasting reels. Guides may be single- or double-foot versions, with the latter more likely to be used along the entire blank on heavy-action rods or just in the position of the first guide or guides (closest to the reel), and the former generally preferred because it improves rod action and slightly lessens the weight.

Reels mount close to the handle in the reel seat, which makes it fairly comfortable to palm the reel and rod. They are secured in the seat with a locking foregrip that screws down on the reel foot or by a locking ring that screws up on the reel foot.

Baitcasting rod handles are straight or have a pistol grip design, the latter usually found on smaller models. All baitcasting rods that are used for casting have a trigger grip on the underside of the rod, opposite and at the lower end of the reel seat. When you hold the rod, this trigger grip rests under either the middle or ring finger. Rods designed for trolling, which have a long handle, usually do not have a trigger grip so they can fit onto rod holders.

Handle length and overall rod length vary widely according to application, ranging from $5^1/_2$-foot models to 9-footers for steelhead and salmon fishing. Most rods used for casting are in the 6- to $7^1/_2$-foot range.

Baitcasting rods are available in one- and two-piece models. Most of the better rods up to $7^1/_2$ feet long are one piece, although longer models may have a telescoping butt in which the upper section slides into the lower for storage. There are very few travel or pack models among baitcasting rods, but a few excellent ones exist in two-piece versions with a telescoping butt section.

Action, taper, and material construction vary considerably. Baitcasting rods are commonly made of graphite and a mix of graphite and other materials, and many models are specifically tailored to special uses and styles of fishing.

Unlike reels, many of the issues pertaining to baitcasting rods—functions, materials, and

In addition to matching up with the right rod, a particular fly line also matches up with the size and weight of the fly to be used, as well as the conditions (open water and wind being more demanding than sheltered environs). Flies that are very air resistant or that are heavily weighted require greater line sizes, as do windy conditions.

Backing. With the exception of the smallest reels that accommodate the lightest line weights, the nonfishing end of fly line is attached to backing, which is a line that helps fill up the spool and stands in reserve to aid in playing large fish. Without backing it would take more turns of the handle to retrieve line onto the spool, and the line would be stored in small coils, which is harder to stretch out and may inhibit casting by having the line flap against the guides when cast. Backing promotes line storage in large coils, which are more easily straightened for easier use.

Backing also provides a reserve for those instances when a large fish takes a fly and heads to the next county. In most freshwater fishing and some saltwater fishing, the angler seldom gets to the backing on the reel when playing a fish, but when you need it, you'd better have it.

The size of the reel spool in conjunction with the length of the fly line determines how much backing is suitable; in turn, the size of fish that might be encountered and its fighting abilities determine how large a reel and overall capacity (fly line plus backing) is appropriate. Braided Dacron and braided or fused microfilament line, which have very low stretch, are the best products for backing because they wind on easily with less chance of binding than nylon monofilament line; 20-pound strength is standard for use with fly lines up to about the 7-weight class, and 30- or 40-pound strength is used with heavier fly lines. As a rule for the heavier lines, keep in mind the breaking strength of the fly line itself and don't undercut it. Smaller reels require only about 50 yards of lighter backing. The amount of backing necessary on larger reels used for bigger fish is in the 150- to 200-yard range, although greater backing is required for big-game species. Thin-diameter high-tech lines allow for the use of 50- and 60-pound backing line with the diameter of a conventional 20-pound line, and high-tech 30-pound backing with the diameter of conventional 15-pound line means that a much greater amount can also be employed (for more on standard lines, *see: line).*

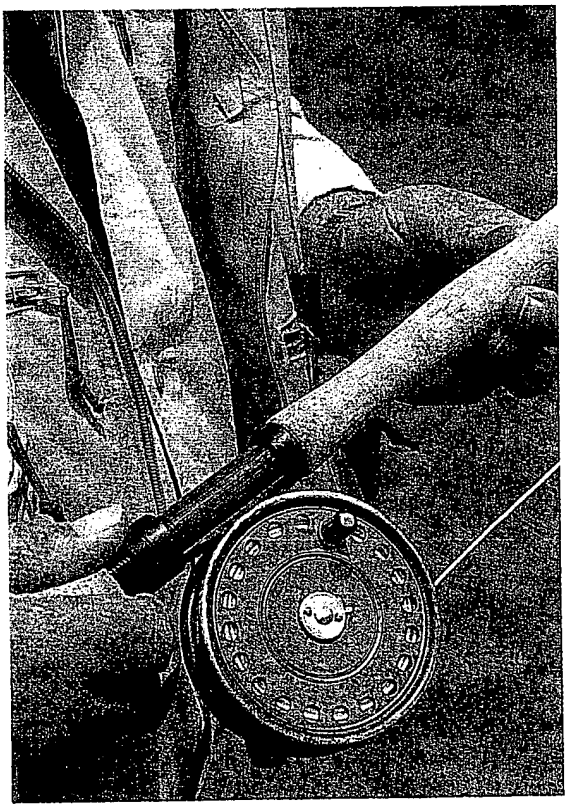
Reels

Fly reels have long been described as storage devices for fly line that had little or no function in casting or playing fish; this is because they were, until recent decades, mostly used for relatively small fish in freshwater. With the application of fly-casting tackle for very large and strong fish in all environments, reels have evolved into much sturdier products with more functional retrieval and fish-playing characteristics, in addition to being a way to store fly line and backing.

Although some type of reel used for catching fish can be first ascribed to the Chinese around the middle of the twelfth century, the earliest written account of fishing reels appeared in England in 1651 in *The Art of Angling,* a book by Thomas Barker; Izaak Walton even mentioned a "wheel" on a salmon fishing rod in *The Compleat Angler* two years later, and it can be assumed that these developments started an evolution in fishing rods or poles, not the least of which included the creation of guides for the passage of line. By the mid-nineteenth century in Europe, a revolving spool reel called a centrepin was widely used for varied fishing activities, although it had an inert and relatively wide spool and two-handled cranking. This was the forerunner of the fly reel.

Centrepin reels were revolving spool reels, and in appearance they were not unlike the earliest forerunners of baitcasting reels. Still in specialized use today in Europe for coarse fishing with floats *(see),* centrepins are also known as float reels, have a 3- to 4-inch overall diameter, and feature a simple flanged spool on a single axle. They were greatly improved in Nottingham, England, in the mid-nineteenth century by the incorporation of a smooth, free-spinning spool, and the new found sensitivity revolutionized fishing for coarse species.

In the 1870s, several modifications by a number of craftsmen, including Charles Orvis, the founder of that prominent tackle purveyor and creator of the first perforated spool fly reel (1874), made these bulky and heavy reels more suitable for fly fishing



Flycasting reels are basically simple line-storage devices, although some have more advanced drag-control features.

United States Patent [19]

Neufeld

[11] **Patent Number: 4,662,585**

[45] **Date of Patent: May 5, 1987**

[54] **THUMB STOP WITH INTEGRAL SPRING**

[76] Inventor: Henry L. Neufeld, c/o Zebco Div., Brunswick; 6101 E. Apache St., Tulsa, Okla. 74101

[21] Appl. No.: 758,758

[22] Filed: Jul. 25, 1985

[51] Int. Cl.[4] A01K 89/01

[52] U.S. Cl. ..... 242/84.2 A; 74/555

[58] Field of Search ..... 242/84.2 A, 84.21 A, 242/84.5 P; 74/555

[56] References Cited

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3,481,554	12/1969	Hull .	
4,156,510	5/1979	Hull .	
4,415,129	11/1983	Neufeld .	

Primary Examiner—Billy S. Taylor

[57] ABSTRACT

A thumb button is disclosed for use in a fishing reel having a rotatable spinner head retained within a housing, the spinner head being displaceable axially by depressing the thumb button. Stops are associated with the thumb button to confine rearward rotation of the button away from a depressed position. Pivots are operatively associated between the thumb button and the housing, the thumb button being pivotable about the pivots. A spring tab is molded as an integral part of the thumb button for engaging the inside of the housing to constantly maintain the spring means and, thereby, the thumb button under loaded condition.

5 Claims, 2 Drawing Figures

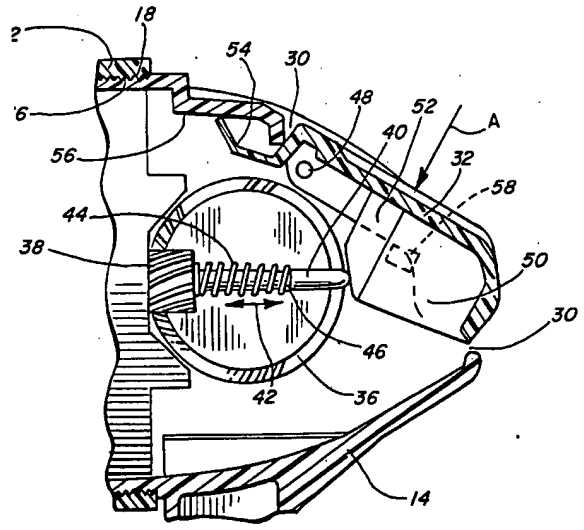
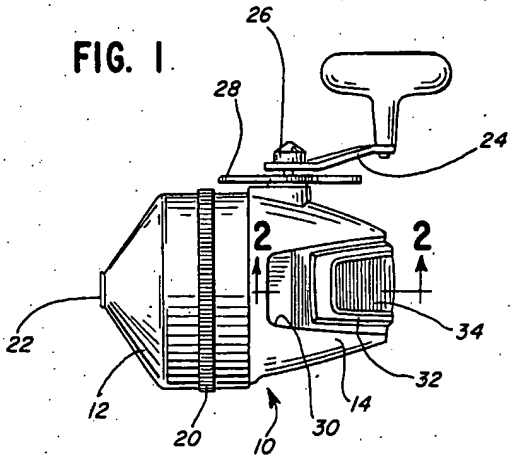


FIG. 1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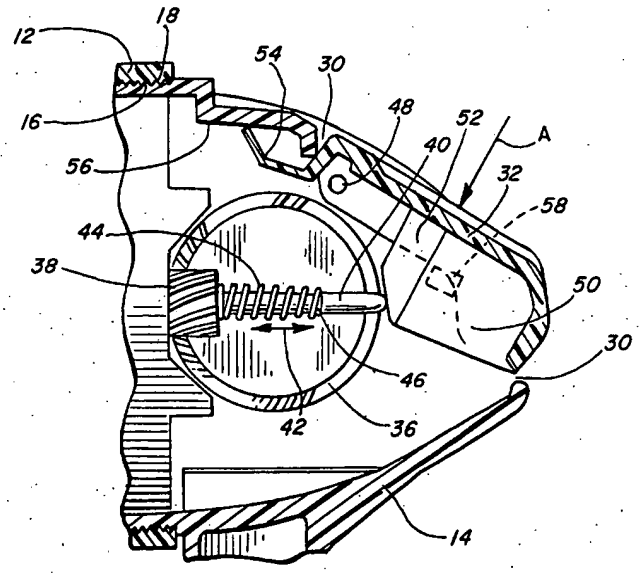
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FIG. 2

THUMB STOP WITH INTEGRAL SPRING

BACKGROUND OF THE INVENTION

This invention relates to spinning or spincast style fishing reels and, more particularly, to an improved, integral spring means for the thumb button of the fishing reel.

In traditional spincast, and sometimes spinning, reel constructions, a depressible thumb button is pivotally mounted to the reel housing for displacing a spinner head through an intermediate center shaft. As exemplified in the spincast reel disclosed in U.S. Pat. Nos. 3,481,554 and 4,156,510 to Hull issued respectively on Dec. 2, 1969 and May 29, 1979, a pair or opposed sidewardly extending pivots adjacent the forward portion of the thumb button are snapped into slotted pivot openings in the walls of the rear cover. One or more tabs integrally formed with the button may be included toward the rear of the button to abut a ledge on the inner surface of the rear cover to confine the rearward pivoting of the thumb button away from a depressed position. Unrestrained pivoting of the thumb button occurs between a rearmost position and simply a rearward position where the button engages the center shaft, when a biasing means is absent as is common in early reel constructions. Consequently, an undesirable rattling might occur as the thumb button pivots within the reel housing. With the reel in a substantially upright position, the weight of the thumb button urges the same into engagement with the center shaft which causes wear on the button as well as aggravating the rattling problem. Additionally, when the thumb button is depressed from adjacent its forward edge or the button is urged in a forward direction, the pivots tend to disengage from the pivot openings because resistance is provided only by the restraining force of the walls of the pivot openings on the captured pivots, again in absence of any biasing means.

In order to solve these problems, spring means have been used in operative engagement between the reel housing and the pivotable thumb button to urge the button upwardly and away from its depressed position. In my U.S. Pat. No. 4,415,129, issued on Nov. 15, 1983, I disclose the use of a spring means engageable with the reel housing and the pivotable thumb button to urge the button upwardly and away from its depressed position. The spring means comprise one or more elongate resilient legs which are engageable with and retained by a tab depending from the reel cover. The spring means, by maintaining constant pressure on the button, prevents rattling, yet offers minimal resistance to the depression of the button by an operator. The rearwardly directed component of the spring force on the thumb button resists dislocation of the sidewardly extending pivots from the slotted pivot openings within which the pivots are seated. This patent is incorporated herein by reference.

However, it should be noted that the use of a separate spring, as disclosed in my aforesaid patent, requires separate tooling for making the spring. For instance, the spring may be a stamped part which requires a separate tool. In addition, tooling is required for assembly of the separate spring to the thumb button and/or housing, along with all of the accompanying labor costs. Furthermore, the mounting means for such separate springs

can become loosened through wear or abuse and result in rattling.

This invention is directed to an improved, integral spring means which is extremely simple and cost effective and overcomes many of the problems set forth above.

SUMMARY OF THE INVENTION

An object, therefore, of the invention is to provide a spincast or spinning style fishing reel with an improved spring means.

In the exemplary embodiment of the invention, the spring means is designed for use in a fishing reel having a rotatable spinner head retained within a housing, the spinner head being displaceable axially by depressing a pivotable thumb button. Stop means are associated with the thumb button to confine rearward rotation of the button away from its depressed position. Pivot means are operatively associated with the thumb button and the housing, the button being pivotable about the pivot means. Spring means are formed integrally with the thumb button for biasing the button toward a rearward stop position.

As disclosed herein, the spring means comprises an elongated tab molded as an integral part of the thumb button. The tab projects forwardly of the button and is located for engaging the inside of the housing to constantly maintain the spring means under loaded condition, thereby eliminating rattling.

Other objects, features, and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

The features of this invention which are believed to be novel are set forth with particularity in the appended claims. The invention, together with its objects and the advantages thereof, may be best understood by reference to the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify like elements in the figures and in which:

FIG. 1 is a top view of a spincast fishing reel with a depressible thumb button; and

FIG. 2 is a fragmented vertical section, on an enlarged scale, taken generally along line 2—2 of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in greater detail, and first to FIG. 1, a spincast type fishing reel is shown and includes a closed face housing, generally designated 10, comprising a front cup-shaped cover 12 and a rear cup-shaped cover 14. The front cover has internal threads 16 (FIG. 2) formed on the rearmost internal surface thereof. The rear cover has external threads 18 formed on a forwardly facing end portion thereof for mating with the internal threaded portion of the front cover. A knurled gripping ring 20 is formed about the outside of front cover 12 to facilitate manual rotation of the front cover. An annular line guide 22 is mounted at the forward edge of front cover 12. A crank shaft (not shown) has a handle 24 secured to the outer distal end thereof by a nut 26. A star wheel 28 is rotatable relative to the crank shaft and about the same axis for controlling the reel drag. The rear cover 14 has a rearwardly facing opening 30 that is substantially rectangular in shape and

extending through a sloped upper portion and vertical rear portion of the cover. A one-piece thumb button 32 has a shape substantially mating with the shape of opening 30 in the rear cover. The upper surface of the thumb button is serrated, as at 34, which prevents an operator's thumb or finger from slipping as the button is depressed.

Referring to FIG. 2, handle 24, through the crank shaft, rotates a cup gear 36 which is meshed with a pinion gear 38 fixed to a center shaft 40 for rotating the shaft. The center shaft rotates the spinner head of the reel and is mounted for fore and aft movement in the direction of double-headed arrow 42 in FIG. 2. Movement of the center shaft 40 in a forward direction releases the spinner head for casting. A coil spring 44 embraces the center shaft and abuts against a shoulder 46 of the shaft to bias the shaft rearwardly. The remaining specific mechanism through which the reel is operated is generally known and does not form a part of this invention and thus a detailed discussion of the same is omitted.

Still referring to FIG. 2, a pair of opposed pivots 48 extend outwardly from the side of push button 32 and snap into appropriate slotted openings in the adjacent side walls of opening 30, as is known. Center shaft 40 is displaced axially forwardly by depressing thumb button 32 inwardly in the direction of arrow "A" to rotate the button about pivots 48 in a clockwise direction as viewed in FIG. 2. Upon depressing the button, a protruding ledge 50 depending from the underside of the button engages the distal end of center shaft 40 moving the shaft in the forward direction. The ledge has a wider forward portion 52 for actually engaging the center shaft.

Upon release of thumb button 32, spring means 54 biases the button in a counter-clockwise direction to permit spring 44 to return center shaft 40 to the right end FIG. 2.

More particularly, spring means 54 is formed as an elongated tab projecting forwardly of thumb button 32 for constantly engaging an inner wall 56 of housing rear cover 14. The tab is molded as an integral part of the thumb button.

Stop means in the form of a pair of sidewardly extending tabs 58 on thumb button 32 engage under appropriate ledges on the inside of the rear cover. This stop means confines rearward rotation of the thumb button from its depressed position. It can be seen from FIG. 2 that even in the rearmost position of the thumb button, integral spring tab 54 is maintained in constant engagement with the inside of the housing thereby to constantly maintain the spring means under tension or loaded condition. This prevents rattling of the thumb button regardless of its position. In other words, the spring tab can be sufficiently bent and maintained under tension to constantly maintain the thumb button spring-loaded. This structure compensates for wear during a long life for the reel without ever permitting the thumb button to rattle. The thumb button 32, spring tab 54, pivots 48 and stops 58 all can be molded as a unitary plastic component.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or central characteristic thereof. The present examples and embodiments, therefore, are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.

I claim:

1. In a fishing reel having a rotatable spinner head retained within a housing including stationary means, the spinner head being displaceable axially by depressing a pivotable thumb button, and stop means associated with the thumb button to confine rearward rotation of the button away from its depressed position, the improvement comprising:

pivot means operatively associated between the thumb button and the housing, the button being pivotable about the pivot means; and

spring means molded as an integral part of the thumb button for engaging the stationary means on the housing to constantly maintain the spring means under loaded condition, and for biasing the button toward a rearward stop position.

2. The fishing reel of claim 1 wherein said spring means comprises an integral elongated tab projecting forwardly of the thumb button.

3. The fishing reel of claim 2 wherein the stationary means is the inside of the housing.

4. In a fishing reel having a rotatable spinner head retained within a housing, the spinner head being displaceable axially by depressing a pivotable thumb button, and stop means associated with the thumb button to confine rearward rotation of the button away from its depressed position, the improvement comprising;

pivot means operatively associated between the thumb button and the housing, the button being pivotable about the pivot means, and the button projecting rearwardly of the pivot means and exposed through an opening in the housing; and

an elongated spring tab molded as an integral part of the thumb button and projecting forwardly of the pivot means into engagement with the inside of the housing to constantly maintain the spring tab and, thereby, the thumb button under loaded condition.

5. The fishing reel of claim 4 wherein the thumb button, the spring tab, the pivot means and the stop means all are molded as a unitary plastic component.

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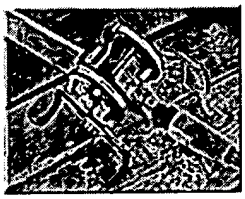
REELS

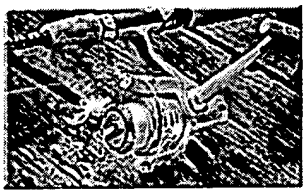


Baitcasting Reels

Baitcasting reels provide better lure control and accuracy and are suited for lines testing 10 pounds or heavier. They have a tendency to backlash or snarl when the spool spins faster than line is paying out, especially when casting into the wind.

While magnetic braking features on baitcasting reels do help prevent backlashes, the most important control is the spool tension knob (usually next to the handles). To set it for each lure, hold the rod perpendicular to your body, disengage the spool and loosen the tension just until the lure starts to drop, then tighten slightly.

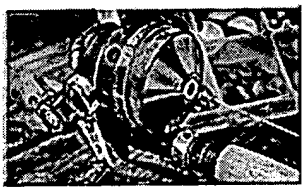
To cast, disengage the spool and hold your thumb on the spool. Release thumb pressure on the spool when you want the lure to move forward. It is crucial to learn to control spool revolution speed with your thumb.



Spinning Reels

These open-face, skirted-spool reels have a stationary spool. Line is wound onto the spool as a bail rotates around it. Spinning reels can handle practically any size line, but they are preferred for lightweight lures and line lighter than 10-pound test. They also perform better than baitcasting reels for casting into the wind. A disadvantage of spinning reels is that they eventually twist the line, creating loops, knots and tangles. When these occur, it is best to replace the line. To help prevent line memory and tangles, drop your spool in a glass of water the night before you go fishing and let it soak overnight.

To cast, place your hand on the rod handle with the spinning reel beneath it and with your middle finger in front of the reel "foot." Open the bail and hook the line behind the first knuckle of your index finger. To release the line, straighten your index finger. To control the distance of the cast and make the lure touch down softly, "feather" the line by moving your index finger close to the spool, causing the line to slap against the finger as it unwinds. To stop the line, press your finger against the spool lip.



Spincast Reels

These closed-face "push-button" reels are easy to use because they are relatively tangle-free and provide comparatively long, smooth casts. The spool is housed inside a cylindrical covering and remains stationary as a line pick-up pin rotates around the spool. Do not stint on quality when you purchase a spincast reel; you get what you pay for. While they are touted for beginning fishermen, they also are popular among some advanced anglers.

To cast, depress and hold the push-button, then release when you want the lure to move forward. Various models are made to handle practically any weight of lure; be sure to match the line size to lure weight.

Reel Tips

- My boys love to fish, but they are at the age, 4 and 6, where they don't have the dexterity to fish for long hours without their hands becoming tired. As fatigue set in, the hook and weight attached to the business end of their spincast reels can become an uncontrolled missile. To make their fishing more enjoyable, I turned to one of the quality spinning reels currently on the market. Since the trigger replaces the traditional button found on the classic spincast, the boys use their index finger to pull the trigger. They use a more natural hand motion, and point to the spot where they would like the bait to go with that same

trigger finger. This has greatly improved their accuracy and control along with being more comfortable for them. If you have young ones who like to fish, take a minute and check out the spinning reels. I'm glad I did. -- Ed Corio

- The most important thing about refilling your spinning reel is to not overfill it. If, when you open the bail, the line "jumps" off the spool, you are over filled. It's also important to use a "soft" line that still is as strong as advertised. I've used 100's of brand names before settling on one. All the others would break when tightening down the knot (polymer). I will NEVER use anything but STREN Easy Cast on my spinning reels. No memory, great castability, great sensitivity, priced right too. And I've NEVER broken the line while tying a knot regardless of pound test. -- Marty Klapa

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